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THE SYSTEM OF PEDAGOGICAL AND MEDICAL MEASURES TO ASSIST PERSONS INVOLVED IN THE ELIMINATION OF CONSEQUENCES ACTS OF TERRORIST ORIENTATION

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Abstract. The number of factors that change the professional health of participants in the elimination of the consequences of terrorist acts may be greater than in a situation of combat stress. An extensive range of private studies related to the study of psychological and functional conditions, but carried out within the framework of very different and difficult to compare theoretical and methodological traditions, make it important to develop a common approach to assessing conditions and further professionalization of employees. The rehabilitation technology is proposed, which has the form of a coherent step-by-step multilevel structure of rehabilitation pedagogical, psychological and medical measures. Methods of differential psychophysiology are used to increase the effectiveness of rehabilitation measures. Within the framework of stress theory, a single integrative physiological indicator is used. In order to obtain objective data on the mechanisms of the occurrence of a health disorder, the structure of unconscious tension and adaptive capabilities of the organism are investigated. Psychophysiological methods of objectification of the effectiveness of pharmacological psychotherapy and methods of differentiation of mental disorders based on the analysis of electrodermal activity are being introduced into complex therapy. A mathematical model is being created — a digital double of an employee, which is used both for psychological and medical correction, and in the process of professional study. During special training, conditions are created to increase the stress resistance of the individual and reduce the likelihood of developing post-traumatic stress disorders. The property of adaptability to the support of both the employee himself and the entire system of organization of his service is being formed. The personnel department gets the opportunity to solve the pedagogical problem of ownership, which is the product of combining the skill and personality traits of an employee.

Key words: terrorism; medical and psychological rehabilitation; differential psychophysiology; digital double of an employee; psychotherapy; ideomotor training.

СИСТЕМА ПЕДАГОГИЧЕСКИХ И МЕДИЦИНСКИХ МЕРОПРИЯТИЙ ПО ОКАЗАНИЮ ПОМОЩИ ЛИЦАМ, УЧАСТВУЮЩИМ В ЛИКВИДАЦИИ ПОСЛЕДСТВИЙ АКТОВ ТЕРРОРИСТИЧЕСКОЙ НАПРАВЛЕННОСТИ

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Резюме. Количество факторов, изменяющих профессиональное здоровье участников ликвидации последствий актов террористической направленности, может быть больше, чем в ситуации боевого стрессирования. Предлагается технология реабилитации, имеющая форму связанной поэтапной многоуровневой структуры реабилитационных педагогических, психологических и медицинских мероприятий. Для повышения эффективности реабилитационных мероприятий используются методы дифференциальной психофизиологии. Создается математическая модель — цифровой двойник сотрудника, участвующего в ликвидации последствий акта террористической направленности, которая используется как для психологической и медицинской коррекции, так и в процессе дальнейшей профессиональной учебы.

Ключевые слова: терроризм; медико-психологическая реабилитация; дифференциальная психофизиология; цифровой двойник сотрудника; психотерапия; идеомоторная тренировка.

The practice of carrying out measures to eliminate consequences of terrorist acts involves providing medical and psychological assistance to persons participating in its suppression, as well as to persons who suffered as a result of terrorist crimes. However, social and psychological rehabilitation that follows the terrorist act has not yet become the task of system for supporting professional activities of such employees. At the same time, events of the terrorist act, being beyond the range of ordinary human experiences, can lead an employee to internal conflict, cause the change in functional readiness as ability of his functional systems of the body to perform professional actions. Depending on the nature of the terrorist act, all of the above can be additionally aggravated by the combined impact of physical, chemical and biological factors on an employee. That is, the number of factors that change his professional health when eliminating consequences of terrorist acts may be even greater in a situation of combat stress.

The main task of support system for an employee involved in the liquidation of consequences of terrorist attack should be to promptly detect traces of the combined effects on somatic and psychological health, organize rehabilitation and achieve resolution of internal conflicts resulting from stress. In special pedagogy (training), psychology and medicine, a single generally accepted approach to rehabilitation and treatment of consequences of stressful effects in witnesses of the terrorist act has only relatively recently become the object of scientific research. And there is still no agreed interdepartmental concept which may be a base for correction and rehabilitation of specialists of dangerous professions in order to maintain their special training.

There are not many methods of correction and rehabilitation that have been tested in practice, use of which

allows for a stable reduction in the severity of violations of consequences of the terrorist act. In Budyonnovsk, Pyatigorsk, Essentuki, Mineralnye Vody, Stavropol, methods of clinical, pathopsychological, psychophysiological and information diagnostics and therapy were applied to help victims. Pathogenetic intensive complex therapy using intravenous infusions of complex pharmaceuticals was developed and carried out [1]. But generally agreed medical and psychological concept remains matter of debate almost from the beginning of the intensification of international terrorism on the territory of the Russian Federation [2].

In military medicine, diagnostics and correction of consequences of combat stress reaction are among the least studied issues. At preclinical level, existing methods of preserving occupational health have proven to be insufficiently effective [3]. The integral characteristics of specialists, understood as the ability of the body and psyche to maintain their compensatory and protective properties, do not characterise their professional functional readiness in a professional activity situation. The problem of ownership, which is the pedagogical product of combination of skill and personality traits, remains outside the field of view of personnel department. Therefore, to remain effective professional activity, it is necessary to organise education and maintenance of stress resistance of an employee. Medical community paid attention to this 50 years ago, in 1967. Rehabilitation is understood as “system of state, socio-economic, medical, professional, pedagogical, psychological and other measures aimed at preventing the development of pathological processes leading to temporary or permanent loss of working capacity...” [4]. On this basis, we have drawn attention not only to medical and psychological, but also to

pedagogical component of assistance to persons involved in suppressing a terrorist act.

In developing the idea of such rehabilitation, a special technology is proposed. It represents a coherent, step-by-step, multi-level structure of pedagogical, psychological and medical rehabilitation measures, presented in Figure 1. In developing and substantiating the concept of medical and psychological rehabilitation of an employee who participated in the elimination of the consequences of a terrorist act, an approach is used based on the goal of maintaining professional health, ensuring the required effectiveness of his activities. During special training, special conditions should be created to increase the stress resistance of individual and reduce the likelihood of developing post-traumatic stress disorders.

Structural scheme of studying the occupational health of an employee who participated in the liquidation of consequences of the terrorist act includes three directions.

First direction is damaging and adverse factors and their effects. Entire multilevel system of measures to counter the negative factors of the terrorist act is built around this area.

Second direction is minimising the risk of disorders. It includes professional psychological selection, medical screening, forecasting the body's resistance, pre-nosological diagnosis, express diagnostics in the process of supporting the employee's service activities, and psychotherapy of an employee.

The third direction is prevention of developing disorders. It includes a system of medical and psychological rehabilitation of employees to counteract damaging factors, special methods of training and education (special and targeted psychological training, ideomotor training). Also, the development of professionally important psychophysiological qualities, methods of increasing resistance to factors, as well as correction, medical and psychological rehabilitation are included in this system. Also, this direction is associated with the use of bioindication method based on psychophysiological diagnostics for the purpose of express environmental monitoring of places where a terrorist act was committed in order to provide the employee with timely medical assistance.

In the complex of rehabilitation measures, scientific prerequisites are distinguished, the main ones are:

1. Action of factors accompanying the terrorist act is manifested in integrated response of all systems and organs of a person and in maladaptation, disruption of harmony of interaction of internal organs and functional systems of the body. This determines the use of methods of integrative medicine, studying the phenomena of chronoresistance, assessed by changes in parameters of biological rhythms and disruption of the interaction of functional systems.

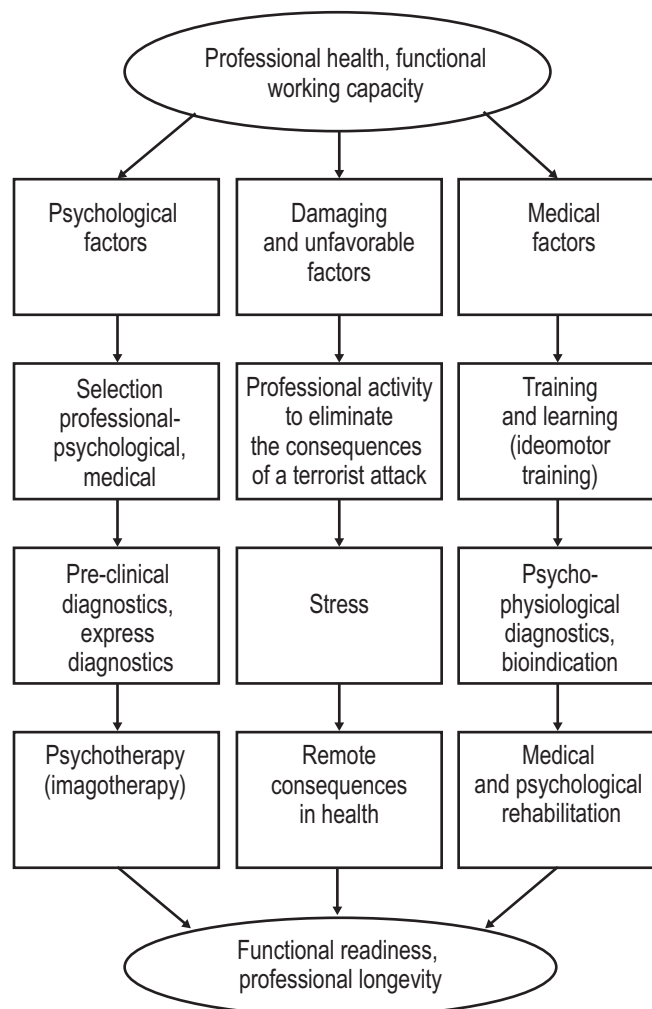


Fig. 1. Structural scheme of the rehabilitation measures of an employee after participation in the elimination of consequences of the terrorist act

2. Sanogenesis, which is theoretical basis of rehabilitation, in addition to compensation, includes restitution (restoration of damaged structures' activity and their multilevel interaction) and regeneration (structural and functional restoration of integrity of tissues and organs after their damage or partial loss). On this basis, medical rehabilitation implements systemic principle in the formation of required level of functional readiness of an employee.

3. Impact of external physical factors can activate and balance excitatory and inhibitory processes, increase their mobility, improve the overall tone of the body, relieve fatigue and improve mood and performance, and have a beneficial effect on employee's psyche. The ability of external physical factors to actively and interrelatedly influence physiological processes not only makes it possible to determine the presence of factors damaging professional health in the widest range, but also suggests the inclusion

of physiotherapy and integrative physiology methods in rehabilitation measures.

4. Rehabilitation process involves identifying possibilities of compensating for impaired functions and their adequate stimulation. The compensation is provided by forming new temporary connections that ensure the mobilisation of reserves. It may be done by including intact structures of the body in activity instead of damaged ones, and by creating new functional connections and systems based on employee's analysis the situation of the terrorist act and actions to eliminate its consequences.

There is a diversity of problems and wide range of individual researches related to the study of psychological and functional states, but carried out within the framework of very different, sometimes difficult to compare theoretical and methodological traditions. This makes the task of developing a unified approach to assessing the condition and further professionalisation of employees involved in eliminating the consequences of terrorist acts particularly urgent. Rehabilitation implemented in the form of support for professional activities should involve not only managing functional and psychological states of an employee in order to increase the effectiveness of professional activity, but also the formation of the specialist's adaptability to such support (psychological and medical). Pedagogical and ergonomic paradigm of professional development and formation of a specialist allows to realise such opportunity [5].

Paradigm is based on the theory of functional systems proposed by P.K. Anokhin, K.V. Sudakov's systemic quantum behavior conception, the concept of dominance by A.A. Ukhtomsky, adaptive homeostatic strategies, ideas about normology, integrative medicine and integrative physiology. The content of the rehabilitation of persons involved in liquidation of the consequences of terrorist attacks is not only a targeted impact on the compensatory-adaptive mechanisms of regulation of the main physiological and mental functions. This is based on psychophysiological diagnostics, monitoring and assessment of the level of psychological and physiological reserves of the body [6]. Conditions that activate the systemic organisation of the necessary mental processes, states and personality traits that allow risk management and further faster adaptation to dangers of upcoming professional activities (pre-combat training) are created. Property of adaptability to support of both an employee himself and the entire system of organisation of his service is being formed.

Also, since the late 1990s, the Clinic of Borderline Conditions of the Stavropol State Medical University has been providing assistance to the Operational Investigative Directorate for the North Caucasus Federal District of the FSB

of the Russian Federation, the Main Directorate of Internal Affairs for the Stavropol Territory, and the Ministry of Emergency Situations for these purposes. During development of a medical and psychological technology for rehabilitation of victims of terrorism, the Clinic's staff proved the possibility of dynamic monitoring of human state at different functioning levels (phase portrait of an individual). Digital models of humans have been developed based on the study of the structure of physiological processes (pharmacodynamics of post-traumatic syndrome) of special forces personnel, refugees and forced migrants [7].

Psychophysiological methods of objectification effectiveness of pharmacological psychotherapy and methods of differentiation of mental disorders based on analysis of electrodermal activity are being introduced into complex therapy of patients. Within the framework of the stress theory, single integrative physiological indicator is used [8]. To obtain objective data on mechanisms of occurrence of health disorders, structure of unconscious tension and adaptive capabilities of employees' body are investigated.

The hardware and software psychophysiological complexes used by the Clinic of Borderline States of the Stavropol State Medical Academy have been developed in the USSR since the mid-80s of the last century. At that time, there was the urgent need to create express diagnostics for health of specialists working in extreme fields: astronautics, aviation, nuclear power. Also, in view of the worsening demographic situation, the growth of morbidity in most nosological units, and high child and adult mortality, the task of creating a national health passport was set at the state level in 1988. As part of the implementation of decisions adopted by the Council of Ministers of the Soviet Union, the Ministry of Health issued an order to conduct general medical check-up of population. But at that time, the country did not have technical and material means to implement such an order. Creation of pre-nosological diagnostics system was entrusted to the Academy of Sciences of the Soviet Union. The development of "Medical device for diagnostics and preventive health examinations of population and assessment of effectiveness of pharmacological and non-pharmacological agents" was carried out in execution of decisions of the Council of Ministers' State Committee of the Soviet Union, special decisions of the Ministry of Defense Industry of the Soviet Union and the Ministry of Health of the Soviet Union [9].

Diagnostic method had to have such qualities as scientific character and feasibility of method of obtaining information, simplicity and efficiency of examination, clarity of information provided to operator in order to minimise examination time, reproducibility of diagnostic results, reliability and verifiability of information received by a doctor.

Medical devices for pre-nosological diagnosis were created quite quickly in the capital and several regional scientific centers. In 1989, computer system of electrodermal activity analysis was presented, implementing express diagnostics according to the method of R. Voll (V.A. Egorov, V.A. Likharev, A.V. Samokhin, Yu.V. Gotovsky and others). The device "AMSAT" (automated medical system of therapy analysis) and device "IMEDIS" have been clinically tested at the Central Military Research Aviation Hospital (CMRAH). In the construction of these devices, the developments of not only the listed authors were used. According to the procedure established by the Ministry of Health of the USSR, in order to obtain permission to use the devices, Soviet inventors had to submit mechanisms to Moscow to the Laboratory of New Medical Equipment along with the design documentation.

Such cooperation between capital and provincial specialists turned out to be very useful for state. Later, in early 1990s, the cooperation resulted in the organisation of training courses all over the Russian Federation under the patronage of the Moscow Medical Academy named after I.M. Sechenov. In 1992, the courses were organised, by the Scientific and Advisory Center "GALS" with participation of V.A. Chasovsky, L.M. Kudayeva and V.A. Likharev.

Training of specialists in electroacupuncture in Stavropol was facilitated by specialists in medical equipment V.I. Krivokon and A.I. Kolomiytsev. They are the authors of a hardware and software complex.

The "VIKA-BOS (FOBOS)" is one of the original diagnostic devices according to the R. Voll's method, developed on initiative basis and presented to the Laboratory of New Medical Equipment in 1986. The "VIKA-BOS (FOBOS)" system has undergone clinical trials at the Central Research Institute for reflex-therapy, the Moscow Regional Clinical Research Institute named after M.F. Vladimirsky, and the Central Military Research Aviation Hospital (CMRAH).

That is why by the time a group of terrorists took over 1,500 people as hostage in Budyonnovsk and there was real threat to their lives, the Stavropol State Medical Academy (SSMA) already had both medical equipment and specialists from laboratory of clinical and biophysical diagnostics of the Borderline Psychic Disorders Clinic who were ready to use this equipment. Methodological approach to the rapid assessment of combined impact of terrorist act factors was based on biorhythmology and the theory of functional systems. So, the system-structural approach was implemented, when main attention was paid to the specifics of interaction of subsystems of the body as complex system. Observation of hostages who sought medical attention after the end of an anti-terrorist operation was carried out continuously for the next month and a half, and episodically for the next 10 months. In total, more than 700 people were examined.

For differential diagnostics of combined effects of the terrorist act, studying the consequences of combat stress, adaptive reserves of several functional systems of the victim's body were assessed on the basis of the same indicator — chronoresistance. The sistemokvants of the body's vital activity corresponding to the situation of a terrorist act were studied. The Laboratory of Clinical and Biophysical Diagnostics of Borderline Psychic Disorders Clinic of the SSMA used combination of "AMSAT" and "VIKA-BOS (FOBOS)" devices for differential diagnostics not only in 1995, but also in the following 20 years.

Based on the results of the study of psychological and functional state of victims of terrorism and employees who took part in the elimination of consequences of terrorism, it can be concluded that when assessing the adaptive capabilities of the body's functional systems and studying the causes of the decrease in adaptive potential, it is necessary to create digital models. For this purpose, doctors I.O. Boev and S.V. Zolotarev used methods of non-parametric statistics and discrete mathematics, which made it possible to classify patients according to the degree of damage and reasons for deterioration of their condition [10].

Modeling was used both in process of supporting employees in performance of their functional duties and in conducting rehabilitation measures after their participation in eliminating the consequences of a terrorist act.

This allowed not only qualitatively but also quantitatively to substantiate medical, psychological measures and special measures of professional training required to maintain occupational health. The rehabilitation measures listed in Figure 1 are accompanied by:

- conducting physiological stress tests and monitoring dysfunctional relationships of the employee's entire body within the framework of integrative physiology;
- study of functional systems of the body of employees who took part in elimination of consequences of terrorism, in order to assess the strength and intensity of physiological processes occurring in the body during the rehabilitation measures;
- identification at different stages of pathology of disorders of the regulation integrative systems of the body and establishment, in comparison with the norm (controls), of the range of their physiological reserve, in particular, both to metabolic and functional loads, and to the combined impact of mostly subthreshold combined physical and chemical factors of a terrorist act;
- assessment of the functional readiness of the employee and assessment of physiological indicators of activity, i.e. study of the degree of excessive or insufficient tension of the functional systems of the body that ensure this activity.

Combining ideomotor training and psychophysiological diagnostics of an employee allows assessing the

employee's readiness to further perform professional tasks, determining the level of development of the required skill and professional proficiency. This information can be used in organising special training, for conducting the rehabilitation measures in the process of psychological and medical supporting the service activities of an employee who participated in the liquidation of consequences of a terrorist act.

CONCLUSION

1. There are scientific and practical prerequisites for creating support for psychological, psychophysiological and functional state of employees in order to solve the problem of correcting post-traumatic stress disorders that manifest on their own in an employee at preclinical level after participating in eliminating consequences of a terrorist act.

2. System of protection against the combined impact of terrorist act factors on the functional state of an employee should not be limited to activities to identify the fact of impact, assess this impact and carry out rehabilitation measures. A set of preventive medical, psychological and pedagogical measures of professional training is necessary.

3. Psychophysiological diagnostics, implementing an integrated approach to employee assessment, allows us to study the results of physical, chemical and psychological impacts on the employee, as well as to determine the type of stress. In the case of chronic disorders or their delayed manifestation, the choice of individual therapy largely depends on the method used by the psychotherapist. It is possible to quantitatively assess the effectiveness of the psychotherapeutic method, as well as the same, but with the additional use of ideomotor training — the level of functional readiness of an employee to further perform professional tasks.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

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