

CREATION OF A DECISION SUPPORT SYSTEM FOR INDIVIDUAL HEALTH IMPROVEMENT OF PERSONS WORKING AT CRITICAL INFRASTRUCTURE FACILITIES

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***Annotation.** The article considers the issues of creating a decision support system (DSS) for medical personnel to individualize medical and recreational activities for people who have gone through crises and work at critical infrastructure facilities. The DSS is built based on the Viable System Model (VSM). The requirements for the DSS and possible ways for their solutions using information technologies are substantiated.*

***Key words:** viable system model (VSM), decision support system (DSS), the type-variety principle, video analysis of movements, cluster analysis, ontological knowledge bases, integral health, persons who have gone through *crises*.*

Relevance. Ensuring effective performance and health support for individuals involved in the management, operational security and protection of critical infrastructure (systems with a high cost of failure) during the COVID-19 coronary pandemic has become an important issue directly related to important national security assurance responsibilities. The vitality of personnel and the reliability of functioning systems are closely intertwined. Any failures of personnel associated with memory

impairment, somatic disorders, increased fatigue, or unstable mental status can lead to disruptions in the performance of complex systems and/or even their failure.

The idea of systemic (human-technical) maintenance of critical objects can be implemented in the framework of DSS, which is based on the principles of the viable systems model [1]. Scientific and technical support of critical infrastructure facilities is a fruitful approach to ensure the reliability of their operation. This approach can also be used to maintain the functionality of the personnel of these facilities.

The DSS was created for a multidisciplinary medical team responsible for the health of the personnel. It is based on modern technical equipment, mathematical models and decision-making algorithms, artificial intelligence methods, targeted individual medical and health-improving measures, and includes the following three subsystems for operational problem solving.

Subsystem 1 is designed to receive and provide information on new treatment and rehabilitation methods from the worldwide databases of evidence-based medicine. The subsystem is implemented by constructing automatic ontological bases built on the basis of a semantic-syntactic model of a natural language, and uses non-negative factorization of linguistic tensors - multidimensional arrays of linguistic data obtained by frequency analysis of large text corpora [2]. Data from medical databases of proven medicine are used as linguistic data [3].

Subsystem 2 is used to record the course of treatment and to gain new insights into its effectiveness. It records the actions of a multidisciplinary team to diagnose the condition of the body systems, select a treatment program (protocol) and make its correction depending on the patient's response to the actions. A distinctive feature of the subsystem is that, in addition to traditional medical information (electronic medical records, instrumental and visual examinations), it also contains data originated from the patient himself (electronic patient diary, data from electronic devices), as well as data from intelligent video analysis systems, such as PTAR [4]. The collected data will be used for statistical, cluster analysis to gain insights into treatment effectiveness in evidence-based medicine. Input data for the analysis: the main disease, grouped with a group of comorbidities, and approaches to their treatment. The paper proposes a method based on the apparatus of possibility theory and an approach to

solve clustering problems for the case where the parameters of the clustering algorithm are represented as a fuzzy value or a vector of fuzzy values [5].

Subsystem 3 is intended for the selection and execution of individual complexes of physical exercises, with the possibility of controlling their execution remotely. A variety of physical exercises have already been used as therapeutic and health benefits. Based on extensive medical research, including the assessment of the functional state of the musculoskeletal system, algorithms for the selection of individual complexes of physical exercises from various health-improving practices have been developed. Complexes of physical exercises allow you to act on various systems of the body (cardiovascular, nervous, respiratory, muscular, ligamentous, etc.) and at all stages of treatment (hospital, clinic, sanatorium, service, home).

Based on the system analysis of the problem and the diversity and type-variety principle [6-8], special decision-making methods and devices, based on the results of each physical exercise or exercise series, the DSS will make recommendations to improve the psychological and social health of patients. The use of a computer system and video analysis, built on the basis of the "Model of Unified Algorithmic Environment", allows you to remotely organize the implementation of a series of exercises [9].

The presence of three subsystems of the DSS allows implementing the main feature of viable systems model: they can adapt to constantly changing aggressive environmental influences under conditions of global stress and pandemic.

Conclusions. To create a DSS based on the principles of the system resilience model, modern and effective information technologies are used for the collection, processing and analysis of data, which gives us hope that the individualization of treatment will shorten the time and quality of health restoration in people working in facilities with critical infrastructure, thus increasing their safety and the security of the country as a whole.

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