

CLINICAL PSYCHOLOGY

Psychological Rehabilitation of Patients with Cardiovascular Diseases by Correction of Cognitive Impairment

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Background. This survey article reviews research and academic writings analyzing cognitive features of patients with cardiovascular diseases.

Objective. To review the academic literature on the feasibility of psychological rehabilitation of cardiovascular patients by correcting cognitive impairment.

Method. Analysis and compilation of academic writings by Russian and foreign researchers.

Results. The cognitive dimension of coronary heart disease (CHD) patients has a number of features linked to the effect of their disease, and to their cognitive and psychological status. The article presents diagnostic techniques used to assess the patient's cognitive state. The experimental data demonstrates the effectiveness of cognitive training with cardiovascular patients. The article also describes recommendations for cognitive rehabilitation of coronary heart disease patients, for choosing the right "target" of remedial psychological intervention, and for assessment of the recovery process.

Conclusion. Rehabilitation programs are promising for patients with coronary heart disease and other somatic diseases.

Keywords:

psychological rehabilitation, cognition, remedial psychological training, cardiovascular disease, psychological-pedagogical process, neuropsychology

Introduction

In order to provide high-quality psychotherapeutic help, scientists have defined key lines of research into the psychological condition of people suffering from somatic diseases. These include: examining personality and emotional-behavioral activity; studying the mechanisms of psychological adaptation and of patients' axiological and semantic sphere; assessing the effect of behavioral features on clinical-chemical and psychological indices; diagnosing individual psychological features of the patient's illness representation and choosing the right behavioral strategy in the advent of the disease; examining reasons for resisting psychotherapy; psychological assessment of the risk of somatic pathology and its connection with the emotional state; remedial psychological work with patients, given their cognitive state, in the clinical dynamics of the disease (Krasnov & Paleev, 2014; Ovchinnikov, 2011; Smetanova & Podoyantsina, 2015).

Cardiovascular diseases occupy the leading position in total incidence and disability among the Russian population. Multiple studies have shown that the risk of psychological disadaptation increases in patients who have suffered from an exacerbation of coronary heart disease (CHD), life-threatening cardiogenic conditions, and cardiac surgery (e.g., Chumakova & Trifonova, 2012; Lazareva & Nikolaev, 2012; Pogosova, 1998; Sumin, 2015). However, despite the abundance of literature on psychological features in patients with a somatic (cardiological) profile, some aspects of the issue still require more thorough research. For instance, the majority of authors link the decrease in the Life Quality Index of cardiology patients with only the clinical features of the disease – such as myocardial infarction, cardiac arrhythmia, and cardiac insufficiency – but they do not consider the cognitive and psychological aspects (Alekhin, 2012; Zvereva & Roshchina, 2017). The cognitive dynamics indices of cardiology patients remain outside the researchers' attention, although these might be important for evaluating both negative effects of the surgery and the quality of the rehabilitation programs provided. Consequently, one of the main goals of psychological assistance is most likely to be to increase the effectiveness of rehabilitation through remedial psychological techniques that form or restore the patients' cognitive functions.

The methods of medical help for patients suffering from various cardiological diseases have improved significantly, which has had a positive impact on quality of life and life expectancy. However, the increasing median age of the Russian population entails several changes in a person's organism, one of which is a steady build-up of cognitive deficiency. Yakhno et al. (2012) reported that 3,210 patients participated in the "Prometheus" all-Russian epidemiological study of the prevalence of cognitive impairment in the elderly (mean age 69.5 ± 5.5) by means of the Mini-Mental State Examination (MMSE) and clock-drawing tests. According to the findings, 2,677 participants (83.4%) complained of memory or cognitive impairment. Objective neuropsychological research methods supported these claims among 2,190 patients (68.2% of the total), while 810 (25.2%) scored 24 points or lower on the MMSE scale, which is indicative of pronounced cognitive impairment. These results prove the high prevalence of cognitive impairment among the Russian elderly (Yakhno et al., 2012).

Modern medical psychology regards the cognitive sphere as a complex systemic entity that depends on the brain's organization of higher mental functions

(HMFs) (Smetanova & Podoyntsina, 2015). Diagnosing and correcting cognitive impairment is important because these psychological conditions limit aspects of living and cause social disadaptation. Consequently, in order to provide psychological assistance, it is necessary to study the cognitive characteristics of patients with somatic pathology and those suffering from CHD in particular.

Method

We compiled and analyzed academic writings. The field of neuropsychology, founded by A.R. Luria, devised neuropsychological research methods to study HMFs in local and diffuse brain pathology, in mental disorders, and various types of dyontogenesis in children and adolescents (Alves, 2014; Krasnov & Paleev, 2014; Ryzhova, 2017; Zvereva & Roshchina, 2017). Neuropsychological methods were first used in diagnosis, treatment and, psychological correction of cognitive disorders in children and adults. Luria created the method of syndrome analysis of cognitive function disorders in organic brain disorder, and was the first to introduce the terms “neuropsychological factor” and “neuropsychological syndrome”, which represent a compound of neuropsychological symptoms caused by impairment of cognitive functions (Smetanova & Podoyntsina, 2015). Examination of cognitive parameters started to employ not only quantitative, but also qualitative assessment of HMF disorders (analysis of the patient’s errors, compensatory abilities, and mental activities), as well as identifying primary and secondary symptoms, and the impaired and preserved cognitive parameters. The qualitative method of cognitive analysis, using neuropsychological cards, has enjoyed successful application in the clinical study of endogenous psychological disorders (Ershov, 2011) and was of great help in differentiating types of cognitive impairment in neurodegenerative and vascular atrophy diseases (Smetanova & Podoyntsina, 2015; Zvereva & Roshchina, 2017). This method allowed both the creation of psychologically corrective work models for patients who had various degrees of cognitive impairment, and the optimization of cognitive activities in healthy adults and the elderly.

The Petersburg scientific school of clinical psychologists pays a great deal of attention to cognitive impairment. E.R. Isaeva and G.G. Lebedeva have identified three types of cognitive deficit in paranoid schizophrenia. They have outlined the differences between the Russian and foreign approaches to studying the cognitive sphere: that the Russian approach is based on the principle of qualitative analysis of mental disorders, whereas foreign neuropsychologists are primarily concerned with quantitative measurement of mental functions (Isaeva & Lebedeva, 2017).

To evaluate the level of cognitive restoration, both Russian and foreign researchers use a complex of neuropsychological diagnostic techniques: the Mini-Mental State Examination, the Frontal Assessment Battery (FAB), the Montreal Cognitive Assessment (MoCA), the clock-drawing test, the Schulte Table, association tests (semantic speech activity), The Mattis Dementia Rating Scale, the “10 Words Memorization” test, the Randt Memory Test, the Wechsler Memory Scale, the Digit Symbol Substitution Test (DSST, WAIS-III), the Trail Making Test, Andre Rey’s Test, the Wisconsin Card Sorting Test (WCST), and the Stroop Color and Word Test (SCWT). These techniques make it possible to evaluate the main cognitive

parameters in patients with CHD and other somatic diseases (Blossom et al., 2017; Cassilhas, Lee, & Fernandes, 2012; Chervinskaya & Shchelkova, 2005; Cyarto et al., 2016; Jelcic et al., 2012; Liu-Ambrose, 2010; Nagamatsu et al., 2013; Solodukhin et al., 2016; Tarasova, Trubnikova, Kukhareva, & Barbarash, 2015; Tchakoute, 2017; Trubnikova et al., 2017; Williams, 2013).

Cognitive activity is an integral part of human development. The psychological-pedagogical process is nothing more than an activity mediated by cognitive abilities. According to V.D. Schadrikov's concept of cognition systemogenesis, a person's abilities are a complex structure, mediated by the systemic structure of the brain, interfunctional connections, and activity oriented mental process (Gorbunov & Tkacheva, 2011; Smetanova & Podoyntsina, 2015). The optimal structure of a person's cognitive sphere predetermines successful cognition. Human cognition concerns learning abilities, interaction with the environment, acquisition of practical skills, and how information is processed. The foundation of cognition is linguistic ability, which creates various multi-level schemes and structures in one's mind and underlies specific characteristics of mental development (Smetanova & Podoyntsina, 2015). Thus, "cognition" is a personality feature that allows one to process separate elements of information on different levels of the psychic apparatus, with language as the foundation. "Cognitive process" means processing information on different levels of the psychic apparatus in order to acquire knowledge (Gorbunov & Tkacheva, 2011).

In academic literature, the term is mostly used in the description of cognitive development of a student or a patient in the process of psychological-pedagogical interaction. Here we are dealing with the following characteristics (Akhmetova, 2009; Ryzhova, 2017):

1. cognitive activity of a person as a subject of education;
2. interaction with the learning environment and formation of an individual self-regulatory style;
3. interiorization of knowledge by the subject and its further exteriorization in practice;
4. influence of sociocultural factors on a person's cognitive development;
5. mechanisms of the cognitive education itself;
6. mechanisms of formation of an individual learning style.

Results

Psychological assistance in the course of rehabilitation is a complex of psychological, pedagogical, and socio-psychological measures, the purpose of which is to restore or compensate for impaired mental functions and allow the return of the patient's social functioning. The rehabilitation of patients with CHD requires the development and maintenance of the optimal level of physical, psychological, and social well-being, and includes a set of medical and social measures aimed at the high-quality and quick restoration of health and social status.

The research that has been conducted on the cognitive state and behavioral characteristics of patients with CHD has found that the "target" psychological effect might be the cognitive sphere, with a view to actualize and restore resource

potential after a planned heart surgery (Tindle, Davis, & Kuller, 2010). The level at which cognition can be preserved is directly linked to the choice of optimal stress-overcoming strategies and the patient's illness representation, as well as effective adaptation in problematic situations. It is therefore necessary to study cognitive characteristics in CHD patients in order to increase their stress-resistance (Solodukhin et al., 2016; Solodukhin, Maleva, Kukhareva, Seryy & Trubnikova, 2017).

The relevance of rehabilitation measures with CHD patients is due to the strong possibility of their social disadaptation and the limited choice of remedial psychological activities (Von der Gablentz, Tempelmann, Münte, & Heldmann, 2015). According to several studies, CHD patients who underwent heart surgery or survived cardiac emergencies experienced the following cognitive disorders: asponaneity (*syndromum apallicum*), inactiveness, and inertia (Alekhin, Trifonova & Chernoray, 2012; Chumakova, 2012; Shvarts, 2013; Tarasova et al., 2015).

Asponaneity is a patient's inability to involve him or herself independently in the rehabilitation process. Patients with asponaneity are inert; they find great difficulties in engaging with other people. When given a task, they remain inactive or quickly lose interest. In cases where CHD patients also possess an anxious, hypochondriacal, or sensitive illness representation, asponaneity manifests itself as an unwillingness to undergo diagnostic or therapeutic measures on their own, adhere to rehabilitation prescriptions, or the patients ignore the chances of complications during outpatient treatment (Alekhin, Sorokin, Trifonova & Chernorai, 2012).

Inactiveness is a condition where patients take more time than needed to carry out tasks and react to stimuli, while displaying psychomotor retardation as well. They refuse to cooperate with medical specialists and avoid any activity that might create an impression of an irresponsible attitude toward treatment. In a conversation, the patients respond to a doctor's questions after very long consideration, and their utterances are situational and simplified. While performing a task, the patients find planning troublesome and take more time than necessary.

Inertia is a difficulty which can switch between different activities. This is also observed in communication with the patient, when it may become problematic to change the topic of conversation. Inertia manifests itself on the elementary and systemic level, involving the patient's behavior.

These cognitive disorders often coincide with hyperactivity, distractibility, and impulsiveness. Patients become overly active without a clearly defined goal. Additionally, such disorders involve ignoring the disease in an activity that is not connected with the treatment, which leads to failure to observe medical recommendations (Alekhin, Trifonova & Chernoray, 2012).

Such behavior is due to impairment of cognitive functions, particularly a negative change in the attentional process (Selnes, 2008; Trubnikova et al., 2017). Insufficient cerebral circulation leads to a decrease in the degree, stability, and distribution of attention. These cognitive disorders often occur against a background of psycho-emotional disorders, which makes it difficult to perform psychological diagnostics (Barrera, 2016; Katsarou, 2013; Leifheit-Limson, 2010). Various cognitive disorders pose challenges in adhering to prescribed treatment, due to decreased concentration and impaired perception (Chowdhury et al., 2013).

Cognitive impairment caused by cognitive biases and reduced psychophysiological parameters leads to disorders in time perspective, i.e., the connections between

the past, present, and future (Hosseini, 2017). Reduced circulation in the frontal and temporal lobes causes impairment of future planning skills. Thus, there is no full psychological well-being of the patient and an inadequate perception of their own health (Seryy, Yanitskiy, Solodukhin, & Trubnikova, 2017; Solodukhin et al., 2017).

Among numerous competing theories and methods of psychological help, there are a number of general principles, techniques, and basic scientific attitudes (Akhmetova, 2009; Kolb & Whishaw, 2015; Krasnov & Paleev, 2014). The common aim is to help a person find the optimal way to further their development. Psychotherapy helps an individual to reevaluate their personal experience, objective reality, life aims, and to actualize their abilities. Achievement of these aims depends on different psychological methodologies, but at its core, it is based on similar processes of conceptual transformation. A psychoanalyst dealing with the explicit concept that relates to the ideas and aims of his or her client uncovers a latent concept, existing on the boundary of the conscious, and correlates it with the hidden aspect of the symbol, thus restoring the lost meaning of the repressed event that causes neurosis. Psychotherapists of the existential-humanist school strive for immediate realization of the meaning of life and activity by an individual. Personalized psychotherapeutic practices (psychoanalysis, Gestalt therapy, etc.) are aimed at working with the client by elaborating a temporary focus of meaning (experience, reality, aims), and dealing with psychologically traumatic events through the method of reliving them.

CHD patients, due to the high degree of danger from any stressful effect on their health, require a psychological approach that involves not their innermost experiences, but their behavioral patterns. Thus, it is possible to use cognitive training with CHD patients in order to achieve adaptation of and compensation for their cognitive deficit. The search for a way to correct the cognitive impairment has necessitated remedial psychological techniques in medical practice. One of these techniques is cognitive skills training – a special type of psychological work aimed at correcting the disturbed learning functions and restoring the lost ones.

Foreign studies of the impact of cognitive training on restoring cognitive functions were carried out with patients who had mild and moderate cognitive impairment (Al-Thaqib, 2018; Bahar-Fuchs, Clare, & Woods, 2013; Cyarto et al., 2012; Erickson, Voss, & Prakash, 2011; Gigler, Blomeke, Shatil, Weintraub, & Reber, 2013; Koehler, Wilhelm, & Shoulson, 2013). In rare instances, the cognitive training program included patients with mild dementia. The duration of the session was set from 20 minutes to 2.5 hours, depending on the patient's age, degree of cognitive impairment, and comorbid diseases. The duration of the course was from 2 weeks to 2 months, 2–5 sessions per week. Cognitive training took place both in the form of independent work, and in conjunction with physical exercises. The studies showed that cognitive functions improved significantly in patients with mild cognitive impairment, while patients with a moderate cognitive deficit demonstrated insignificant restoration of cognitive functions. Patients with mild dementia displayed little or no restoration of the cognitive sphere, although cognitive training had a positive effect on their psycho-emotional state (Bahar-Fuchs, Clare, & Woods, 2013; Cassilhas, Lee, & Fernandes, 2012; Chervinskaya & Shchelkova, 2005; Cyarto et al., 2012; Erickson et al., 2011; Gigler et al., 2013; Jelcic et al., 2012; Koehler, Wilhelm, & Shoulson, 2013; Ladowsky-Brooks, 2010; Liu-Ambrose et al., 2010; Nagamatsu et al., 2013; Pogosova, 2015; Svendsen & Teasdale, 2006).

Conclusion

Numerous studies have proven the effectiveness of these measures in restoring cognitive functions. Cognitive training has been accepted and implemented as an essential part of remedial training in patients with different somatic and neurological diseases, such as dementia, Alzheimer's disease, traumatic brain injury, and cardiovascular pathology.

Despite recent improvements in methods to restore cognitive functions, as well as theoretical and empirical data, most discussions revolve around the effectiveness of cognitive training. Many medical institutions create and use measures to help people with various types of cognitive impairment. The following principles for rehabilitation are suggested: teaching the patient to make use of all their compensatory abilities; teaching the patient mnemonics (memorization techniques); explaining the reasoning behind all the measures used; strengthening exercises based on modern theoretical assumptions and empirical data; rehabilitation based on studies with promising results; diagnostic methods to assess change in cognitive functions; cognitive training supervised by a highly qualified specialist or a team of multidisciplinary professionals; taking into account the patient's functional and professional aims; identifying and monitoring problems that require additional medical or psychological intervention; psychological counseling combined with cognitive rehabilitation (Ladowsky-Brooks, 2010).

Cognitive training might be used to prevent and correct the following psychological disorders: behavioral inactivity; attention defect; impaired motivation and intention to act; reduced targeting and control over one's actions; frustration-aggression and anxiety. Cognitive training combined with psychological counseling makes it possible to integrate the physiological and psychological level for a more successful rehabilitation and improvement of the quality of life of cardiac patients.

Researchers are currently faced with numerous issues in understanding cognitive impairment in various pathological conditions and at different ages. The main areas of research are the relationship between cognitive and social functioning, cognitive deficits and the success of adaptation, and the dynamics of cognitive disorders during treatment. Information about the positive effect of training sessions on the recovery of cognitive functions in somatic patients allows us to conclude that cognitive training is very promising for patients who suffer from CHD and other somatic diseases.

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