Characteristics of physical rehabilitation for stroke survivors, evaluated through the lens of their psychological and emotional well-being

PhD, Associate Professor **V.A. Kapustina**[1]
[1]Novosibirsk State Technical University, Novosibirsk

Corresponding author: kapustina@corp.nstu.ru

Abstract

Objective of the study was to assess the correlation between the indicators of the psychological and emotional state of patients following a stroke and their motivation to participate in physical therapy during the rehabilitation process.

Methods and structure of the study. The psychological assessment was performed using the Hospital Anxiety and Depression Scale, the Integrative Anxiety Test, the Asthenia Assessment Scale, the Compliance Scale, and the Short Neuropsychological Examination of the Cognitive Sphere. The study involved 35 participants aged between 60 and 80. The study was conducted at the Clinical Hospital No. 2 in Novosibirsk.

Results and conclusions. The findings of the research revealed a strong correlation between depression and a decrease in physical activity, as well as between the level of adherence to treatment and the performance of physical exercises for fine motor skills and memory. The data obtained indicate that the creation of rehabilitation programs for elderly patients with these characteristics should encompass not only conventional measures aimed at restoring motor and cognitive abilities, but also enhancing motivation and the significance of the rehabilitation process itself. This can be achieved through the use of innovative engineering solutions in the organization of physical therapy in healthcare and rehabilitation facilities, as well as through providing competent social and psychological support during treatment and rehabilitation.

Keywords: rehabilitation after stroke, therapeutic exercise, psycho-emotional state, motivation for recovery, elderly people.

Introduction. Currently, rehabilitation measures for patients who have suffered a stroke are becoming increasingly diverse: new engineering products (stabiloanalyzer with biofeedback, VR suit, computer games using virtual reality technologies and cognitive simulators, etc.) and social solutions (use of psychological and medical means to improve the psychoemotional state, the relationship between the patient and medical staff, interaction with the patient's immediate environment, etc.) are being developed. As studies show, the involvement of patients after a stroke in the rehabilitation process through the use of virtual reality to perform routine daily activities has proven its effectiveness in providing short-term improvements in cognitive nature [7]. Along with this, maintaining constant communication with the attending physician increases the level of trust in the medical staff and the willingness of patients to actively participate in the rehabilitation process by reducing the uncertainty in obtaining the necessary knowledge [5]. In this regard, competent social and psychological support aimed at increasing the motivation for patient recovery is becoming an important aspect of physical rehabilitation.

Objective of the study was to assess the correlation between the indicators of the psychological and emotional state of patients following a stroke and their motivation to participate in physical therapy during the rehabilitation process.

Methods and structure of the study. The research was conducted jointly with E.A. Kudishina during 2023 on a sample of patients who had suffered a stroke at Novosibirsk City Clinical Hospital No. 2. The

total number of participants in the experiment was 35 people aged 60 to 80 years.

Research methods: Hospital Anxiety and Depression Scale (HADS) adapted by A.V. Andryushina, M.Yu. Drobizhev; integrative anxiety test (authors: A.P. Bizyuk, L.I. Wasserman, B.V. Iovlev); asthenia assessment scale (MFI-20) [2]; Morisky-Green compliance scale [1]; brief neuropsychological examination of the cognitive sphere (BNCS) [4]. Data were collected using printed forms with the written consent of the subjects in the first week after the stroke. Statistical analysis was performed using jamovi Desktop software.

Results of the study and discussion. The analysis of the mean values on the hospital anxiety and depression scale showed values within the normal range (M=7,5 and M=7,6, respectively, with a maximum possible value of 21), while the mean values on the integrative anxiety test were also mostly at the normal level, with the exception of the asthenic and phobic components of personal anxiety (M=6,63 and M=6,6 with a maximum possible value of 9), as well as the data on the asthenia assessment scale (the highest mean value was revealed on the physical asthenia scale (M=12,6 with a maximum possible value of 20). The obtained results allow us to conclude that elderly patients after a stroke generally do not demonstrate typical manifestations of depression and anxiety, but at the same time, in the structure of anxiety, they are characterized by lethargy, fatigue, sleep problems, fatigue, self-doubt, and ideas about their own uselessness. According to the compliance scale, elderly patients demonstrated low adherence to treatment (M=2,21 with a maximum value of 4). An assessment of the data using the brief neuropsychological assessment of the cognitive sphere showed that the worst results were achieved in tasks related to memory work (mean values ranged from 1,9 for tasks on constructive praxis, finding similarities, to 2,2 for tasks on working memory).

Thus, despite the normative indicators of anxiety and depression in elderly patients after stroke, it was found that the sample is characterized by low readiness for treatment, high fatigue and difficulties in performing tasks that require the use of memory functions. In fact, the obtained results give reason to assume the presence of resistance in this group of patients to the rehabilitation and treatment process.

As a result of the correlation analysis using Spearman's Rs-criterion, significant relationships were found between the characteristics of the emotional state of elderly patients after stroke with their cognitive characteristics and readiness for treatment.

Thus, high values of depression correspond to high values of physical asthenia (Rs=0,75, p<0,01), asthenic component of anxiety (Rs=0,7, p<0,01), decreased activity (Rs=0,53, p<0,01), understanding of commands to perform motor exercises (Rs=0,52, p<0,01). This means that the severity of the depressed state and decreased mental activity are combined with decreased motor activity, increased fatigue, tiredness, sudden mood swings, and refusal to perform motor techniques. This result suggests low efficiency of the traditional approach to organizing therapeutic exercise in elderly patients after a stroke, since patients are likely to avoid physical activity in every possible way and critically perceive the need to perform exercises. Low compliance values correspond to high values of constructive praxis (Rs=-0,51, p<0,01) and a set of sequences (Rs=-0,45, p<0,01). This means that a negative attitude towards treatment is combined with a clearer performance of optical-spatial actions (error-free repetition of drawings from a sample) and repetition of previously made drawings from memory. In other words, those patients whose memory is generally functioning normally are skeptical about the treatment and recovery process, which may be related to their negative ideas about the future compared to their memories of a typical lifestyle in the past.

Discussion of results. A study of the characteristics of the psychoemotional state and readiness for treatment and motor activity in elderly patients after a stroke showed the need to introduce new rehabilitation technologies. These can be proven techniques of gamification, stabilotraining [3], virtual reality [7], as well as fundamentally new systems for organizing therapeutic exercise. An example of such a development is the rehabilitation complex "Gefest", created at NSTU within the framework of the "Priority 2030" program, which includes a device that helps the patient restore typical walking patterns, and audiovisual accompaniment that allows you to restore in memory iconic routes characteristic of the area in which a person lives, which adds a semantic component to physical activity, while involving memory and emotions, i.e. the work of both hemispheres at once, which corresponds to the hypothesis of complementary dominance [6].

Conclusions. The results of the study showed the presence of significant links between depression and

decreased physical activity, as well as between the level of adherence to treatment with the performance of physical exercises for fine motor skills and memory. The data obtained allow us to conclude that the development of rehabilitation complexes for elderly patients with the characteristics considered should include not only traditional measures aimed at restoring motor activity and cognitive activity, but also increasing the motivation and meaningfulness of the rehabilitation process itself, which is possible with the use of new engineering products in the process of organizing therapeutic exercise in medical and rehabilitation institutions and competent social and psychological support during treatment and rehabilitation.

References

1. Lukina Yu.V., Martsevich S.Yu., Kutishenko N.P. Shkala Moriski-Grina: plyusy i minusy universalnogo testa, rabota nad oshibkami. Ratsionalnaya Farmakoterapiya v Kardiologii. 2016. No. 12 (1). pp. 63-65.
2. Postkovidnaya asteniya. Algoritmy diagnostiki i lecheniya. Terapiya, publ. 2022. No. 8. pp. 90- 100.
3. Suvorova T.N., Gribova N.P. Dinamika kognitivnykh i psikhoemotsionalnykh narusheniy v rannem vosstanovitelnom periode ishemicheskogo insulta pri provedenii reabilitatsionnykh meropriyatiy s primeneniyem stabilotreninga. Chelovek i yego zdorovye. 2023. No. 26 (3). pp. 29-35.
4. Tonkonogiy I.M. Kratkoye neyropsikhologicheskoye obsledovaniye kognitivnoy sfery (KNOKS). Moscow: Per Se publ., 2010. 69 p.
5. Kayes N.M., Cummins C., McPherson K.M., Worrall L., Bright F.A. S. Developing connections for engagement in stroke rehabilitation. Brain Impairment. 2022. No. 23(1). pp. 42-59.
6. Kitchen N.M., Dexheimer B., Yuk J., Maenza C., Ruelos P.R., Kim T., Sainburg R.L. The complementary dominance hypothesis: a model for remediating the 'good' hand in stroke survivors. Journal of Physiology. 2024.
7. Oliveira J., Gamito P., Lopes B., Silva A.R., Galhordas J., Pereira E., Fantasia A. Computerized cognitive training using virtual reality on everyday life activities for patients recovering from stroke. Disability and Rehabilitation: Assistive Technology. 2020. No. 17 (3). pp. 298-303.