



EVALUATION OF THE EFFECTIVENESS OF DIFFERENTIATED NEUROTROPIC AND ADAPTOGENIC BIOLOGICALLY ACTIVE COMPLEXES IN CORRECTING AUTONOMIC DYSFUNCTION IN HYPERSTHENIC AND HYPOSTHENIC FORMS OF NEURASTHENIA

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Abstract: Neurasthenia is characterized by psychoemotional stress, fatigue, sleep disturbances, irritability, anxiety, and autonomic instability. Differences between hypersthenic and hyposthenic forms require a differentiated rehabilitation approach. This article proposes a study model to evaluate the effectiveness of adding neurotropic and adaptogenic biologically active supplements to standard rehabilitation for correcting autonomic dysfunction. The study is planned to include 60 patients aged 18–45 years, divided into hypersthenic and hyposthenic groups with main and control subgroups. Autonomic function will be assessed using the Kerdo Vegetative Index and heart rate variability (HRV), anxiety using the Spielberger–Hanin State-Trait Anxiety Inventory (STAI), and asthenic symptoms using the MFI-20. Neurotropic complexes will be used for the hypersthenic **form, while adaptogenic complexes will be used for the hyposthenic form.**

Keywords: neurasthenia, hypersthenic form, hyposthenic form, autonomic dysfunction, heart rate variability, Kerdo index, neurotropic complex, adaptogens, biologically active supplements, anxiety, fatigue, rehabilitation.

Introduction: Neurasthenia is characterized by a combination of increased fatigability, reduced physical and mental working capacity, irritability, sleep disturbances, psycho-emotional tension, and various autonomic symptoms. Persistent psychological stress, insufficient recovery, irregular sleep, and prolonged intellectual or physical workload may contribute to functional disturbances of the nervous and autonomic systems. Autonomic dysfunction may manifest through palpitations, sweating, dizziness, sleep disturbances, anxiety, headaches, fluctuations in cardiovascular parameters, and reduced tolerance to physical or mental stress. These symptoms may substantially influence the patient's quality of life and complicate the rehabilitation process.



Research conducted by Uzbek specialists has also addressed autonomic and psycho-autonomic disturbances. In particular, studies involving children and adolescents with neurocirculatory dystonia have examined the relationship between psycho-emotional characteristics, personality traits, and psycho-autonomic regulation. A study published in 2024 involving Uzbek children and adolescents demonstrated the clinical relevance of psycho-emotional and psycho-autonomic changes in patients with neurocirculatory dystonia [1].

The assessment of autonomic regulation using instrumental methods has also been investigated in Uzbekistan. Materials published by the Higher Attestation Commission of the Republic of Uzbekistan describe the use of cardiointervalography for detecting neurovegetative changes and improving rehabilitation approaches in patients with autonomic dysfunction [2]. These findings support the importance of combining clinical assessment with objective functional indicators when evaluating autonomic disturbances.

The clinical manifestations of neurasthenia may differ considerably between patients. In a hypersthenic presentation, irritability, increased excitability, internal tension, sleep disturbances, and anxiety may predominate. In a hyposthenic presentation, fatigue, weakness, decreased physical endurance, reduced mental performance, and general asthenia may be more prominent.

Therefore, applying the same rehabilitation strategy to all patients may not adequately reflect the clinical heterogeneity of neurasthenia. A differentiated approach based on the predominant clinical phenotype may provide a more precise framework for rehabilitation. The present study proposes the use of neurotropic and adaptogenic biologically active complexes as adjunctive components of standard rehabilitation. In the hypersthenic phenotype, a neurotropic-oriented complex is proposed, whereas in the hyposthenic phenotype, an adaptogenic-oriented complex is considered.

The aim of the study is to evaluate the potential effectiveness of differentiated neurotropic and adaptogenic biologically active complexes in correcting autonomic dysfunction and improving psycho-emotional and asthenic symptoms in patients with hypersthenic and hyposthenic forms of neurasthenia. The objectives are to assess autonomic regulation in different clinical forms of neurasthenia, evaluate HRV parameters, determine anxiety and fatigue levels, compare the effects of differentiated rehabilitation with standard rehabilitation, and develop a phenotype-



oriented rehabilitation model.

Materials and Methods: A prospective controlled clinical study involving 60 patients aged 18–45 years with clinically diagnosed neurasthenia is proposed.

Patients are classified according to the predominant clinical presentation into two phenotypic groups:

- hypersthenic form — 30 patients;
- hyposthenic form — 30 patients.

Each clinical phenotype is divided into an intervention group and a control group.

Group	Clinical form	Rehabilitation approach	n
1A	Hypersthenic	Standard rehabilitation + neurotropic complex	15
1B	Hypersthenic	Standard rehabilitation	15
2A	Hyposthenic	Standard rehabilitation + adaptogenic complex	15
2B	Hyposthenic	Standard rehabilitation	15

The final study protocol should include predefined inclusion and exclusion criteria, informed consent procedures, safety monitoring, and approval by an appropriate institutional ethics committee.

Differentiated Biologically Active Complexes: For patients with the hypersthenic phenotype, a neurotropic-oriented complex containing magnesium compounds, L-theanine, and Melissa extract is proposed for investigation. For patients with the hyposthenic phenotype, an adaptogenic-oriented complex containing *Rhodiola rosea*, coenzyme Q10, and B-group vitamins is proposed. These substances are considered in the study as biologically active supplements rather than substitutes for established medical treatment. Their exact composition, dosage, duration of administration, contraindications, and safety monitoring should be determined according to the specific registered product and approved clinical protocol. In Uzbekistan, the production, safety, and circulation of biologically active supplements are subject to specific sanitary and regulatory requirements. The relevant regulatory framework includes sanitary rules concerning the production,



safety, and circulation of biologically active supplements [3].

Autonomic status is assessed using the Kerdo vegetative index and heart rate variability. The Kerdo index is calculated using the relationship between diastolic blood pressure and heart rate:

$$VI = (1 - DBP/HR) \times 100$$

where DBP represents diastolic blood pressure and HR represents heart rate.

HRV assessment includes selected time- and frequency-domain parameters. Particular attention is given to LF, HF, and LF/HF parameters.

However, LF/HF should not be interpreted as a direct and isolated measure of sympathetic activity. It should be interpreted together with other HRV parameters and clinical findings.

Psycho-emotional Assessment

The Spielberger–Hanin State-Trait Anxiety Inventory is used to assess:

- state anxiety;
- trait anxiety.

This allows both the current level of anxiety and the individual's relatively stable tendency toward anxiety to be assessed.

Assessment of Fatigue

The Multidimensional Fatigue Inventory (MFI-20) is used to assess several dimensions of fatigue, including:

- general fatigue;
- physical fatigue;
- mental fatigue;
- reduced activity;
- reduced motivation.

Statistical analysis should begin with assessment of data distribution. Parametric or non-parametric tests should be selected according to the distribution characteristics and study design. Within-group and between-group differences should be analyzed. The level of statistical significance is proposed as $p < 0.05$. Effect sizes and confidence intervals should also be reported where appropriate to provide a more comprehensive interpretation of clinical relevance.

Results: The present manuscript describes a proposed clinical research model; therefore, numerical clinical results are not artificially generated. After completion of the study, the primary analysis should compare changes in autonomic,



psycho-emotional, and fatigue-related parameters between the intervention and control groups. For the hypersthenic phenotype, the primary comparison will involve the neurotropic-complex group and the standard-rehabilitation group. Changes in the Kerdo index, HRV parameters, STAI scores, and MFI-20 scores will be analyzed. For the hyposthenic phenotype, the adaptogenic-complex group will be compared with the corresponding standard-rehabilitation group. The principal hypothesis is that differentiated rehabilitation may result in more pronounced improvement in autonomic regulation and psycho-emotional or fatigue-related symptoms than standard rehabilitation alone. However, these assumptions should only be reported as confirmed findings after completion of the clinical study and statistical analysis.

Discussion: The main methodological concept of this study is the differentiation of rehabilitation according to the predominant clinical phenotype of neurasthenia. Local studies conducted in Uzbekistan have demonstrated the importance of psycho-emotional and autonomic factors in patients with neurocirculatory and autonomic disorders. In Uzbek children and adolescents, neurocirculatory dystonia has been investigated in relation to psycho-emotional characteristics and psycho-autonomic regulation [1,4].

The use of instrumental approaches to evaluate autonomic regulation is also supported by Uzbek scientific research. Higher Attestation Commission materials describe the use of cardiointervalography for identifying neurovegetative disturbances and evaluating rehabilitation approaches in patients with autonomic dysfunction [2]. The proposed model extends this methodological approach by combining objective autonomic assessment with standardized psychological and fatigue-related instruments. The rationale for using a differentiated approach is based on the clinical distinction between hypersthenic and hyposthenic presentations. Hypersthenic manifestations may be characterized by increased excitability, irritability, anxiety, and sleep disturbances, whereas hyposthenic manifestations may be dominated by weakness, fatigue, and reduced functional capacity. Consequently, a neurotropic-oriented intervention may be investigated in the hypersthenic phenotype, while an adaptogenic-oriented intervention may be investigated in the hyposthenic phenotype. Nevertheless, this conceptual differentiation does not establish clinical efficacy by itself. The effectiveness of biologically active complexes must be determined through properly designed



controlled clinical research.

Particular attention should also be paid to safety. Biologically active supplements cannot automatically be considered equivalent to medicinal products, and their use should not replace evidence-based medical treatment. The composition, quality, contraindications, interactions, and safety profile of each specific product should be documented. The current Uzbek regulatory framework contains specific requirements concerning biologically active supplements and their production and circulation [3]. Therefore, future clinical studies should ensure that all investigated products comply with applicable national regulations. Another methodological consideration concerns HRV. Although LF, HF, and LF/HF may provide useful information regarding cardiovascular autonomic regulation, interpretation of these indices requires caution. HRV parameters are influenced by respiration, posture, physical activity, age, medications, circadian factors, and other variables. Therefore, standardized recording conditions are necessary. The combination of HRV, Kerdo index, STAI, and MFI-20 may provide a multidimensional assessment of autonomic, psycho-emotional, and fatigue-related changes. Such a combined approach may be particularly useful when assessing rehabilitation outcomes. The potential scientific novelty of the proposed research lies in evaluating differentiated rehabilitation according to the predominant clinical phenotype while simultaneously assessing autonomic, psycho-emotional, and fatigue-related parameters.

Conclusion: Hypersthenic and hyposthenic forms of neurasthenia may differ in their predominant clinical manifestations and therefore may require differentiated rehabilitation strategies. The proposed clinical research model evaluates the potential role of neurotropic biologically active complexes in patients with hypersthenic manifestations and adaptogenic complexes in patients with hyposthenic manifestations, alongside standard rehabilitation. The combined use of the Kerdo vegetative index, HRV, STAI, and MFI-20 provides an integrated framework for assessing changes in autonomic regulation, anxiety, and fatigue. Uzbek scientific literature provides a methodological basis for studying autonomic dysfunction and psycho-autonomic regulation using clinical, instrumental, and psychological assessment methods [1–4]. However, the clinical effectiveness and safety of the proposed biologically active complexes cannot be established without real patient data and appropriate statistical analysis. Therefore, the proposed model



should be considered a basis for a controlled clinical study rather than evidence of confirmed therapeutic efficacy.

References:

1. Arzikulov A.Sh., Sultanova F.X., Abdulxakova R., Rahmanova U. Psychosomatic status and personality characteristics of Uzbek children and adolescents and their significance in the development of neurocirculatory dystonia. *International Journal of Scientific Pediatrics*. 2024;7(3):678–683. DOI: 10.56121/2181-2926-2024-3-7-678-683.
2. Higher Attestation Commission under the Ministry of Higher Education, Science and Innovations of the Republic of Uzbekistan. Scientific materials concerning diagnosis of neurovegetative changes and rehabilitation in patients with vegetative dystonia syndrome using cardiointervalography. Available at: <https://www.oak.uz/pages/10710>
3. Committee of Sanitary and Epidemiological Welfare and Public Health under the Ministry of Health of the Republic of Uzbekistan. Sanitary rules, norms and hygienic standards concerning the production, safety and circulation of biologically active supplements (0110-26). 2026.
4. Sultanova F.X., Arzikulov A.Sh. The influence of personality characteristics of Uzbek children and adolescents on the manifestations and development of neurocirculatory dystonia. *International Journal of Scientific Pediatrics*. DOI: 10.56121/2181-2926-2023-5-12-17.
5. Umarova M., Arzikulov A. Clinical characteristics of psycho-vegetative manifestations of vegetative dystonia in the context of harmonious physical and sexual development of adolescents. *International Journal of Scientific Pediatrics*.
6. Ibodullayev Z.R. *Asab va ruhiyat*. Tashkent: medical literature publication.