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EVALUATION OF THE EFFECTIVENESS OF COMPLEX REHABILITATION OF PATIENTS WITH DIABETIC POLYNEUROPATHY IN OUTPATIENT CONDITIONS

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Annotation. The study was carried out on the basis of the Medical and Rehabilitation Centre - a branch of the Kyrgyz Research Institute of Balneology and Restorative Treatment. 155 patients with type 2 diabetes mellitus with diabetic neuropathy of the lower limbs before and after the rehabilitation course were observed. The effectiveness of rehabilitation was most pronounced after 3 months and was about 75%. For long-term preservation of the positive effect and prevention of diabetic foot, repeated courses after 6 months are recommended.

Abstract. The study was carried out on the basis of a medical rehabilitation centre - a branch of the Kyrgyz Research Institute of Balneology and Rehabilitation Treatment. 155 patients with type 2 diabetes mellitus with diabetic neuropathy of the lower extremities were observed before and after the course of rehabilitation. The effectiveness of rehabilitation is most pronounced after 3 months and is about 75%. For long-term preservation of the positive effect and prevention of diabetic foot, repeated courses are recommended after 6 months.

Key words: diabetes mellitus, polyneuropathy, complex examination.

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Diabetes mellitus (DM) is the most common chronic noncommunicable disease and ranks 3rd among the causes of death in the population after cardiovascular diseases and cancer [1, 3, 12].

Among endocrine diseases, diabetes mellitus has gone beyond the usual medical problem and is classified as an urgent and socially significant problem of mankind. Despite the advances in the study of diabetes, the relevance of this problem is not decreasing, and this is primarily due to the fact that diabetes mellitus has become younger, there is an increase in the incidence of the disease in all age groups [5-8].

Diabetic polyneuropathy (DPN) is the earliest and most frequent complication of diabetes. According to different authors, it occurs in 30-90% of patients with diabetes. In some cases, DPN precedes the appearance of clinical signs of DM [9-11].

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Meanwhile, according to experts of the World Health Organisation, in the coming century the prevalence of one of the most serious diseases, type 2 diabetes mellitus, will more than double: by 2025 it will affect more than 300 million people worldwide [4].

In Russia, according to official data alone, about 3 million patients with type 2 diabetes are registered. In its essence, type 2 diabetes mellitus is an age-associated disease [5]. That is why a significant proportion of patients with type 2 diabetes mellitus are elderly people. A significant decrease in the quality of life of elderly patients, severe complications associated with damage to the cardiovascular and nervous systems, early disability and high mortality require further improvement of outpatient and polyclinic care [8]. "International Classification of Functioning, Disability and Health" - abbreviated as ICF (International Classification of Functioning, Disability and Health, abbreviated as ICF) - is a globally recognised classification of 3 components of health and health-related factors, was recommended for international use by the 54th World Health Assembly in 2001. [3, 12-13]. This classification is used in the practical activities of rehabilitation specialists and in such fields as sociology, public health, medical statistics, health care organisation, economics, scientific research and many others. The most difficult is the use of the ICF in the practical activity of rehabilitation specialists. The ICF is a tool for providing a unified approach to rehabilitation (a kind of
A "universal language"), so that professionals from different specialities and health care institutions can understand each other [10].

Currently, the World Health Organisation (WHO) recommends the use of the basic principles that are embedded in the ICF. Thus, the introduction of the ICF leads to a change in the way the rehabilitation professional thinks about the problems of the disabled patient. The focus of the specialist's attention shifts to functioning rather than function. This approach allows a broader view of the patient's problems and a more effective use of the patient's available resources. For example, people around the patient are a resource for the rehabilitation team, and they can perform part of the work with the patient (care, communication, psychological support, walking, verticalisation, etc.) [9, 11].

Material and methods of research

A comparative clinical study was conducted on the basis of the medical and rehabilitation centre - a branch of the Kyrgyz Research Institute of Balneology and Restorative Treatment.

155 patients with type 2 diabetes mellitus with diabetic neuropathy of the lower limbs before and after the rehabilitation course were observed

The first and second groups (main group) consisted of mature and elderly patients with type 2 diabetes mellitus with 1-2 degree diabetic neuropathy of the lower limbs, who received drug treatment according to the protocol of the Ministry of Health of the Kyrgyz Republic and rehabilitation complex in the medical and rehabilitation centre of the KNIIKiVL.

The third and fourth groups (control) consisted of patients with type 2 diabetes mellitus with diabetic neuropathy of lower limbs of 1-2 degree, who received only medical treatment and gymnastics according to the protocol of the Ministry of Health of the Kyrgyz Republic.

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Inclusion Criteria:

- Compensated diabetes mellitus type 2INH I-II degree complicated by diabetic neuropathy of the lower limbs.
- Informed written consent to the application of the complex of examination and rehabilitation.

Exclusion Criteria:

- Decompensated diabetes mellitus with neuropathy with localisation other than the foot.
- Presence of co-morbidities (CCC decompensation, DS, OPN, CPN).
- Type 1 diabetes mellitus.

Table 1

GENERAL PATIENT CHARACTERISTICS

groups	*Age range*	*Medium age*	*Quantity sick*	*Women/. men*	*Duration diseases*	*Duration NAM*
1	45-59 mature	53,66±2,6	44	26/18	11,43 ±1,6	4,12 ±1,5
2	60-74 elderly	63,75±2,9	38	21/17	13.88±1,4	4,16 ±2,5
3	45-59 mature	55,21±2,3	34	18/16	10,39±2.8	4,58 ±2,6
4	60-74 elderly	65,27±1,4	39	24/15	12,34±3.1	4,39 ±1,8

General contraindications to physiotherapy

The patients were examined according to the following directions:

Clinical status, including assessment of complaints, history of diabetes mellitus 2 and DPNP, assessment of lower limbs (determination of skin colour, moisture, presence of hyperkeratosis zones, finger deformities, other bone and joint anomalies, ulcer defects, palpatory assessment of local blood flow in the lower limbs by pulsation of the dorsal and posterior tibial arteries of the foot); Functional diagnostic methods (ECG, BP, Dopplerography of the lower extremities); Clinical blood and urine analyses. The degree of compensation of carbohydrate metabolism was assessed on the basis of glycosylated haemoglobin (HbA1c) and fasting blood sugar.

Neurological examination: the Neuropathic Dysfunctional Scale (NDS) [2] was used to assess the severity of DPNP. In order to quantitatively characterise the subjective sensations of DPNP, the total symptom score (TSS) [2] was assessed, taking into account four main symptoms reflecting the presence of neuropathy: pain, burning, tingling, numbness. Determination of QoL indicators using a questionnaire of quality of life and self-monitoring of the disease, which was compiled on the basis of existing generally recognised techniques for determining QoL in adults [2]. The results of the questionnaire were quantitatively assessed, and the results were compared with indicators of medical aspects of patients' QOL. We selected 24 domains of the ICF most indicative of diabetes mellitus and specifically diabetic neuropathy.

Appropriate defining criteria were matched to each ICF domain and their degree of severity on a five-point scale: O - no problems (0-4%); 1 - mild problems (5- 24%); 2 - moderate problems (25-49%); H - severe problems (50-95%); 4 - severe problems (50-95%).

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absolute problems (96-100%). All examined patients were observed by a multidisciplinary group of doctors: physiotherapist, endocrinologist, neurologist, psychologist, LFK doctor, LFK instructor, physiotherapy nurse, procedural nurse. Patients are recommended 5 meals a day. Basic medication symptomatic therapy (according to the protocol of the Ministry of Health of the Kyrgyz Republic 2017). Physiotherapy included electromassage of both lower extremities with pulsed low-frequency electrostatic field using special gloves on the lumbosacral spine area, posterior surfaces of the thighs, shins and the entire foot, from the Hivamat 200 apparatus at a frequency of 160 Hz 10min, at a frequency of 60 Hz for 5 minutes every other day, the course - 10 procedures. Lymphatic drainage procedures from the device "Lymphavigin" Mode (stimulation programme) for 20 minutes every other day, course - 10 procedures.

Intravenous infusion of OFR (ozonised saline solution) with ozone concentration 1000-1300 every other day. Ozone barbotage of the lower extremities with a plastic bag with a concentration of 2000. Duration of the procedure - 20 minutes every other day 10 procedures. Health-improving gymnastics for feet every day.

Table 2

EVALUATION OF REHABILITATION EFFECTIVENESS

Efficiency	*Pain (cutting, numbness, tingling and burning)*	*ICF Domains*	*KJ Fz and Ps*
Significant enhancement	Decrease in all characteristics	Improving more half of the figures (more than 13)	Both indicators improvement of more than 25 per cent
Enhancement	Reduction of pain and burning	Improving more quarters of indicators (6-12)	Both indicators improvement of more than 25 per cent
No change	Pain reduction	Improving more quarters of indicators (6-11)	Improvement only single indicator more than 25 per cent
Deterioration	The pain doesn't change or worsens	An improvement of less than quarters of indicators (1-5)	Improvement only single indicator more than 25 per cent

Statistical processing of the obtained data was performed on a PC using the software package for statistical data processing STATISTICA for Windows 8.0. The methods of parametric and nonparametric statistics were used.

The methods of descriptive statistics included estimation of the arithmetic mean (M), error of mean (m) - for features with continuous distribution, as well as for the frequency of occurrence of features with discrete values. The median value and quartile range (25%÷75%) were also calculated.

Research results

After a course of outpatient rehabilitation in patients of the first group, reliable dynamics of 19 domains of the category: function, structure and activity was noted.

In patients of the second group, the dynamics of the studied domains of the category function, structure, activity and participation were less pronounced.

In patients of group 3-4 the dynamics of the studied domains of the category function, structure activity and participation - there were no special changes. This proves the effectiveness of the complex of rehabilitation methods of treatment in diabetic neuropathy in patients with diabetes

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mellitus. From the groups of observed patients with diabetic neuropathy of the lower legs.

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The best indicators were in patients of mature age. Comparative assessment of the health status of patients with diabetic neuropathy of the lower extremities during multidisciplinary rehabilitation and treatment according to the MH KR protocol for 3 months is shown in Table 3. Comparative assessment of the health status of patients with diabetic neuropathy of the lower limbs during multidisciplinary rehabilitation and treatment according to the MH KR protocol for 6 months is shown in Table 4.

Table 3

ASSESSMENT OF THE HEALTH STATUS OF PATIENTS (treatment period - 3 months)

groups	*Significant improvement*	*Enhancement*	*No change*	*Deterioration*
1 (n=44)	29,6% (13)	45,4% (20)	20,4% (9)	4,6% (2)
2 (n=38)	23,7% (9)	38,6% (17)	21 % (8)	10,5% (4)
3 (n=34)	0%	29,4 % (10)	50 % (17)	20,5% (7)
4 (n=39)	0%	20,5% (8)	53,9% (21)	25,6% (10)

Table 4

ASSESSMENT OF HEALTH STATUS OF PATIENTS (treatment period - 6 months)

groups	*Significant improvement*	*Enhancement*	*No change*	*Deterioration*
1 (n=44)	13,6 % (6)	40,9% (18)	36,6% (16)	9% (4)
2 (n=38)	10,5 % (4)	34,2% (13)	31,6 % (12)	10,5% (4)
3 (n=34)	0%	15,9% (7)	47 % (16)	32,3% (11)
4 (n=39)	0%	12,8% (5)	48,7% (19)	38,4% (15)

Conclusions

1. With equal severity of pain syndrome, in mature and elderly DNNC patients, assessment of categories according to the ICF reveals the worst indications are in the elderly.

2. Multidisciplinary rehabilitation for DNAC reduces the intensity of pain syndrome, improves functional activity indices, and also increases QoL. At the same time, the degree of positive changes is more pronounced in mature age compared to the elderly.

3. The effectiveness of multidisciplinary rehabilitation is most pronounced after 3 months from the beginning of the rehabilitation complex and is 75% in mature age. This is more often than 1.1 times the similar result in elderly patients (62.7%). The long-term results of rehabilitation (after 6 months) were characterised by preservation of positive results.

4. Comparative assessment of health status after the rehabilitation complex and those observed according to the protocol of the Ministry of Health of the Kyrgyz Republic in 6 months from the beginning of follow-up showed a more than 2-fold increase in the need for course pharmacological correction of pain syndrome.

Practical recommendations

The methodology for assessing functioning, disability and health with the help of ICF domains on the example of patients with diabetes mellitus is adapted to the survey of the population of Kyrgyzstan.

The ICF enables qualitative and comprehensive analyses of the public health of different population groups and assesses the effectiveness of medical rehabilitation

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and, as a consequence, recommended for widespread implementation in the health care system of the Kyrgyz Republic.

To improve the effectiveness of treatment, a rehabilitation complex is recommended for the treatment of patients with diabetic neuropathy of the lower extremities using modern physiotherapy equipment and ozone therapy, in combination with drug therapy.

For long-term maintenance of the positive effect and prevention of diabetic foot, repeated courses after 6 months are recommended.

Effective application of complex rehabilitation in patients with diabetic neuropathy of the lower extremities increases the working capacity of patients, affects the quality and duration of life, reduces disability.

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