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# Modification of the physical therapy programme to factor in cognitive impairment in patients with Parkinson's disease

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**Abstract.** Parkinson's disease is a chronic progressive disease accompanied by motor and cognitive impairment, which considerably complicates the rehabilitation process and reduces the quality of life of patients. The purpose of this study was to evaluate the effectiveness of a modified physical therapy programme adapted to the cognitive status of patients. The study involved 10 patients who were divided into two equal groups: the experimental group (n = 5), which underwent an adapted programme with multisensory stimulation, cognitive motor exercises and slow learning, and the control group (n = 5), which received standard physical therapy. Tests were used for objective assessment: Timed Up and Go (TUG), UPDRS (motor part), Berg Balance Scale (BBS), PDQ-39 and SF-36. As a result, patients in the experimental group demonstrated positive dynamics in all indicators. Specifically, the time in the TUG test decreased from 16.8 ± 0.7 s to 13.2 ± 0.5 s, the UPDRS score decreased from 42.5 ± 2.1 pts to 35.4 ± 1.9 pts, the BBS balance score increased from 38.5 ± 1.5 pts to 41.8 ± 1.3 pts, while the PDQ-39 quality of life index improved from 59.3% ± 3.4% to 48.7% ± 3.1%. The results obtained reflect the expediency of individualising rehabilitation programmes based on the cognitive profile of patients. The addition of cognitive tasks to physical therapy not only improved motor function but also helped to reduce cognitive deficits and improved overall quality of life. The practical value of this study lies in the possibility of implementing a modified physical therapy programme in clinical practice, particularly for multidisciplinary teams working in the field of neurorehabilitation, physical therapists, rehabilitation therapists, and neurologists. The proposed approach can be an effective tool for increasing the functional independence of patients with Parkinson's disease

**Keywords:** rehabilitation; quality of life; multisensory stimulation; motor symptoms; non-motor symptoms; cognitive dysfunction

## Introduction

As the number of patients with Parkinson's disease (PD) and profound cognitive impairment increases, conventional physical therapy programmes are becoming less effective. Cognitive deficits, such as decreased executive function, memory, and attention, complicate exercise learning, reduce motivation, and increase the risk of falls. According to systematic reviews, between 40% and 60% of patients with PD experience cognitive impairment during the course of their disease [1]. These changes often begin with slow thinking (bradyphrenia), difficulty concentrating, impaired executive functions (planning, problem solving), and are followed by episodes of forgetfulness that progress to severe memory impairment. Such symptoms substantially impede the daily functioning of patients,

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reduce their ability to self-care, complicate interaction with society, and reduce their motivation to take part in rehabilitation programmes. For this reason, current clinical guidelines increasingly emphasise the need to integrate a cognitive element into physical therapy to ensure a comprehensive approach to treatment and improve the quality of life of these patients.

Accumulated evidence suggests that exercise can not only improve motor function but also maintain cognitive health. A meta-analysis by R. Kim *et al.* [2] found that physical activity has a significantly positive effect on both global cognition and executive functions. These findings were confirmed in studies where exercise was combined with cognitive tasks. J.H. Zhou *et al.* [3] conducted a randomised controlled trial that demonstrated that the integration of cognitive components into exercise markedly improves executive function. The researchers found a decrease in dual-task cost and an increase in cognitive stability of the intervention participants. This suggests that combined programmes can reduce the effects of cognitive load during physical activity.

Numerous researchers emphasise that cognitive-motor programmes, especially in the dual-task format, positively influence executive functions, attention, and walking stability in patients with PD. A considerable amount of data obtained in the meta-analysis by H. Johansson *et al.* [4] demonstrated a stable improvement in both cognitive functions (primarily executive) and balance when using motor-cognitive training. It was emphasised that dual tasks not only improved functional efficiency but also provided a generalised effect on everyday activity. Particular attention should be paid to the issue of individualising the intensity and complexity of tasks according to the patient's cognitive profile. Y. Zheng *et al.* [5] reached analogous conclusions, addressing in their brief review the effectiveness of dual-load approaches in patients with moderate PD. The researchers emphasised the ability to improve not only cognitive function but also gait dynamics, which is critical for reducing the risk of falls. It was also noted that the ease of implementation of the dual-task approach made it attractive for use in outpatient settings. In their meta-analysis, H. García-López *et al.* [6] focused on reducing the risk of falls, which is a direct consequence of improving spatial attention and the ability to switch between tasks. The study showed that cognitive-motor interventions not only improve certain functional indicators but also develop self-regulation strategies in patients. The researchers addressed the need to standardise methods for assessing the effectiveness of such interventions.

A separate area of research focuses on alternative forms of rehabilitation, including the implementation of boxing programmes. In a systematic review, N. Chrysagis *et al.* [7] analysed 11 studies using boxing exercises (e.g., Rock Steady Boxing), which showed statistically significant improvements in balance, walking speed, strength, cognitive function, and psychoemotional state. Separately, the effects of motivational and social nature were noted, which positively influenced the duration and sustainability of participation in the programmes. Analogously, A. Ferrusola-Pastrana *et al.* [8] proved in their prospective study that multimodal interventions – namely, those that combine aerobics, balance, and strength elements – effectively improve cognitive functioning, especially in patients with early signs of cognitive deficit.

Y. Xiao *et al.* [9] showed that motor-cognitive training provides a sustained improvement in both motor and cognitive functions, with an effect that lasts for at least two months after the intervention. The researchers noted an increase in neuroplasticity, which is the theoretical basis for the stability of the results achieved. At the same time, the researchers noted the need for longer-term follow-up studies.

Particular attention is drawn to studies where physical interventions were combined with the latest technologies, such as virtual reality, interactive interfaces, gamified exercises, or audio-visual cues. For instance, J. Rodríguez-Mansilla *et al.* [10] and J. Yu *et al.* [11] emphasised that VR allows integrating cognitive stimulation into a safe environment that simulates real life situations. The researchers noted that virtual reality helps to reduce apathy, increase motivation, and improve flexibility of thinking.

The analysis shows that the integration of cognitive tasks (dual-task, VR, audio/visual cues) into physical therapy systematically improves both motor and cognitive performance in patients with PD. However, most studies have short-term interventions (up to 12 weeks), are limited by sample size, or focus only on concrete cognitive domains. Additionally, the issue of adapting the intensity and format of training depending on the cognitive status of patients has not been resolved. Based on the identified gaps, the purpose of the present study was to evaluate the effectiveness of a modified physical therapy programme that would optimally accommodate the cognitive status of patients with PD, contributing to the improvement of their physical performance and overall quality of life.

## Materials and Methods

The study was conducted at the Opora Kinesiotherapy Centre in Kyiv and the Department of Human Safety and Health of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" from January to December 2024. Two groups of 10 people (5 women and 5 men) were formed. The average age of women was 64.8 years (m = 0.64), and that of men was 65 years. Experimental group received a modified physical therapy programme. Control group received a standard physical therapy programme without adaptation. Inclusion criteria were diagnosis of Parkinson's disease according to the criteria of the International Parkinson's and Movement Disorders Society (MDS), stage 2-3 on the Hoehn and Yahr scale, as well as the presence of mild or moderate cognitive impairment on the Montreal Cognitive Assessment (MoCA) scale within 18-25 points [12]. Exclusion criteria were severe dementia with a MoCA score of under 18, concomitant severe

somatic or mental illness, and refusal to take part in the study. The study was conducted in strict accordance with the Declaration of Helsinki [13] and following the European Commission's Ethics and Data Protection Guidelines [14]. All participants were informed about the potential risks that may arise from the presentation of their data in a scientific study, as well as about ensuring anonymity and confidentiality of information, and then signed a consent form to take part in the study.

The study methods included clinical neurological examination, assessment of cognitive status using the MoCA scale, assessment of quality of life using the SF-36 questionnaire [15], functional tests of balance and mobility, such as the Timed Up and Go tests and the 6-minute walk test, and statistical analysis, including t-test for dependent and independent samples with a significance level of $p < 0.05$. The physical therapy programme for Parkinson's disease included a variety of exercises aimed at improving the patient's physical and psychological state (Table 1). This modified physical therapy programme for Parkinson's disease was designed to address the specific physical and psychological aspects of the disease. The programme was adapted individually to the patient's stage of the disease and physical capabilities. It was recommended to work under the supervision of a doctor, especially at the beginning of therapy.

**Table 1.** Exercises aimed at improving the patient's physical and psychological condition

| Type of exercise | Purpose/effect | Examples of exercises |
|---|---|---|
| Warm-up and mobilisation of joints | Helps improve blood circulation and reduce muscle stiffness | Light circular movements of the arms, shoulders, ankles, head tilting back and forth and to the sides, stretching the neck, back, and hips. |
| Walking training | Prevention of "freezing" and development of stability | Walking with wide steps with an emphasis on arm movements, turning on the spot, crossing obstacles, walking to rhythmic music or a metronome. |
| Balance and stability exercises | Reducing the risk of falls | Standing on one leg (with or without support), transferring body weight, sitting down to a chair and standing up without hands. |
| Strength training exercises | Preservation of muscle strength and endurance | Squats against the wall, exercises with rubber expander, light exercises with dumbbells (0.5-2 kg). |
| Relaxation and breathing exercises | Stress relief and improved body control | Deep diaphragmatic breathing, progressive muscle relaxation. |
| Coordination exercises | Development of motor coordination | Throwing and catching the ball, changing the direction of movement on command, drawing shapes in the air with hands and feet. |

**Source:** created by the authors of this study

The purpose of the initial examination of the study participants was to comprehensively determine the physical, motor, cognitive, and psychoemotional state of patients with Parkinson's disease. For this, patient history was taken, and the stage of the disease was determined according to the Hoehn and Yahr scale, which provided detailed data on the symptoms and course of the disease. Functional testing of patients included the following methods:

- Timed Up and Go (TUG) [16] – to assess the risk of falls;
- UPDRS (part III – motorics) [17] – to assess motor symptoms;
- Berg Balance Scale (BBS) [18] – to assess balance and control over body position;
- PDQ-39 (Parkinson's Disease Questionnaire) [19] and SF-36 (Short Form Health Survey) [15] – to assess the quality of life of patients, including physical and psycho-emotional well-being.

The cognitive status of patients was assessed using the Montreal Cognitive Assessment (MoCA) test [12], which helped to identify cognitive impairment and its severity. Based on the results obtained, a personalised physical therapy programme was developed, which accommodaated the physical condition, level of motor deficit, the presence of cognitive impairment, and individual needs of patients.

The rehabilitation programme included:

1. Training in walking, balance, coordination, as well as strength and breathing exercises.
2. Modification of the intensity of physical activity according to the level of physical fitness and fatigue of patients.
3. Teaching compensation strategies, including techniques to overcome freezing.
4. Psycho-emotional support using relaxation and stress management techniques.
5. Involvement of relatives in the rehabilitation process to improve the effectiveness of the programme and social integration of patients.

Upon completion of the physical therapy programme, patients were re-evaluated using the same methods and tests: TUG, UPDRS (part III), BBS, PDQ-39, SF-36. The SF-36 and BBS were assessed three times (before treatment, 30 days after the start of rehabilitation activities, and 90 days after the completion of rehabilitation), which allowed tracking the dynamics of health changes throughout the rehabilitation process. This helped to compare the results before and after the therapeutic intervention, evaluate the effectiveness of the programme, and determine the degree of improvement in the physical, motor, and cognitive state of patients.

## Results and Discussion

The study analysed the effectiveness of a modified physical therapy programme adapted to the cognitive state of patients with Parkinson's disease. Its features and differences from the standard programme conventionally used in treatment are presented in Table 2. The principal difference is the addition of a cognitive load in the therapy sessions.

This required the corresponding adaptation of rehabilitation interventions to activate executive functions, reduce the burden on short-term memory, and improve cognitive-motor integration.

**Table 2.** Comparison of a standard and modified physical therapy programme for patients with Parkinson's disease

| Element | Standard programme | Modified programme |
|---|---|---|
| Training structure | 30-40 minutes, 3 times a week | 40-45 minutes, 3-4 times a week |
| Physical activity | Exercises for balance, coordination, gait | Same exercises + cognitive tasks |
| Cognitive load | None | Double task (walking + counting, memorisation, etc.) |
| Types of cognitive tasks | - | Arithmetic on the move (counting in reverse), attention and memory tasks |
| Training method | Direct instructions | Slow learning strategy with multisensory stimulation |
| Response to cognitive profile | Not considered | Tasks are adapted according to the results of the MoCA test |
| Expected outcomes | Improved physical performance | Improved physical performance + cognitive function + improved quality of life |

**Source:** compiled by the authors of this study

The following cognitive tasks were integrated into the modified programme:

- arithmetic exercises while moving (e.g., counting in reverse while walking);
- exercises to memorise words, symbols, or objects;
- spatial orientation with simultaneous physical activity;
- following instructions with a delayed response (executive function training).

The focus was on how cognitive impairment affects the choice of rehabilitation tools and methods, as well as the outcomes of therapy. Patients in the experimental group had an average MoCA score of 20-25 points, which corresponds to mild to moderate cognitive impairment. The results showed that such cognitive-motor integration contributed not only to the improvement of physical indicators (TUG, UPDRS, BBS), but also to a decrease in the level of cognitive deficit. Patients demonstrated improvements in the domains of quality of life related to memory, communication, social interaction, and emotional stability as early as day 30 of the study (Table 3). Thus, the cognitive profile plays a key role in choosing the structure and intensity of a rehabilitation programme. Its consideration can improve the efficacy of the intervention, ensure better functioning in everyday life, and stabilise the psycho-emotional state of patients with Parkinson's disease.

**Table 3.** Mean SF-36 results before and after physical therapy

| Group | Average age | SF-36 before (average) | SF-36 after 30 days | SF-36 after 90 days |
|---|---|---|---|---|
| Experimental (modified) | 68.3 years | 42.5 ± 6.1 | 60.8 ± 5.3 | 70.2 ± 4.7 |
| Control (standard) | 69.1 years | 43.0 ± 5.9 | 51.2 ± 5.7 | 56.7 ± 5.1 |

**Source:** compiled by the authors of this study based on the conducted experimient

The table demonstrates that patients in the experimental group showed a substantial improvement in their general condition after 30 days of rehabilitation, as evidenced by an increase in the average SF-36 score by an average of 17 points. Such dynamics indicates the positive influence of an individualised approach to physical therapy, accounting for the specific features of the cognitive status of patients. In 90 days after the start of therapy, the SF-36 score reached an even greater level, adding more than 9 points, reflecting the continuation of positive dynamics. This suggests that the effect of the modified rehabilitation programme is not only maintained but also enhanced over time. Indicators of physical functioning, vitality, and social adaptation improved significantly. Patients also reported a reduction in anxiety, improved mood, and increased motivation to perform daily tasks. The control group, which received standard treatment, also showed some improvement, but it was less pronounced. The SF-36 score increased by 8.2 points after 30 days and by another 5.5 points after 90 days. The relative improvement shows that basic physical therapy has a positive effect, but its efficacy is inferior to the modified approach. Statistical analysis of changes in SF-36 scores was performed using a paired t-test for matched samples. In the intervention group, a statistically significant improvement was found between all three measurement points ($p < 0.01$). In the control group, the changes were also significant, but less significant ($p < 0.05$), and the increase between 30 and 90 days tended to be statistically significant. The difference between the groups in the final SF-36 score (after 90 days) was 13.5 points in favour of the experimental group, which is a clinically significant indicator in terms of rehabilitation effectiveness. Apart from the quantitative data, it is also worth noting some of the qualitative aspects recorded during the study:

1. Patients in the experimental group demonstrated better emotional engagement in the rehabilitation process, were more active and motivated.

2. Many of the patients reported improved sleep, reduced fatigue and anxiety.

3. There was greater adherence to physical therapy, which is presumably a result of the personalised approach and the integration of cognitive stimulation into the exercises.

To evaluate the effectiveness of the modified physical therapy programme in patients with Parkinson's disease, the study compared the average scores of functional tests before and after the rehabilitation course. Table 4 demonstrates changes in key parameters such as mobility, balance, and risk of falls measured using standardised scales (TUG, BBS, UPDRS-III, etc.). The analysis of the results allows assessing the dynamics of the physical condition of patients in the experimental group and confirming the effectiveness of the proposed approach to therapy.

**Table 4.** Average results of functional tests for balance and mobility of the experimental group before and after physical therapy

| No. | Indicator | Normative value / Description | Result before rehabilitation | Result after rehabilitation |
|---|---|---|---|---|
| 1 | Timed Up and Go (TUG) (seconds) | <10 seconds – normal for healthy individuals; >14 seconds – increased risk of falling | 16.8 ± 0.7 s | 13.2 ± 0.5 s |
| 2 | UPDRS (part III - motorics) (points) | 0 – no symptoms; the greater the score, the worse the condition | 42.5 ± 2.1 pts | 35.4 ± 1.9 pts |
| 3 | Berg Balance Scale (BBS) (points) | 56 points – excellent balance; <45 points – high risk of falling | 38.5 ± 1.5 pts | 41.8 ± 1.3 pts |
| 4 | PDQ-39 (life quality index) (%) | 0% – best quality of life, 100% – worst quality of life | 59.3% ± 3.4% | 48.7% ± 3.1% |
| 5 | MoCA (Montreal Cognitive Assessment) | <26 points – cognitive impairment; maximum – 30 points | 22.1 ± 1.2 pts | 25.3 ± 1.1 pts |

**Source:** compiled by the authors of this study

All indicators show positive dynamics after completing a modified rehabilitation programme. The reduction in TUG time and UPDRS scores reflects an improvement in motor function and mobility. An increase in BBS reflects improved balance and reduced risk of falls. A significant decrease in the PDQ-39 index and an increase in MoCA scores reflect an improvement in the quality of life and cognitive status of patients.

The results showed the benefits of a modified rehabilitation programme that accommodates the cognitive status of patients. This approach not only improved physical performance but also positively influenced the overall psycho-emotional well-being and social activity. Consideration of cognitive impairment in treatment planning allows creating a more effective model for managing patients with Parkinson's disease that meets the principles of personalised medicine. Thus, the study results confirmed the high effectiveness of individualised physical therapy adapted to the cognitive state of patients.

The findings of the present study confirmed that the adaptation of physical therapy programmes to the cognitive status of patients with Parkinson's disease can markedly improve functional performance and quality of life. These data are consistent with the findings presented by G. Abbruzzese *et al.* [20], who proved the effectiveness of using cognitive-oriented strategies in physical rehabilitation, particularly through the involvement of executive functions during motor learning. This approach contributed to the improvement of both motor and cognitive functions. I. Litvan *et al.* [21] also emphasised the significance of integrating cognitive tasks into the process of physical therapy in Parkinson's disease. The researchers noted that patients who took part in multicomponent rehabilitation programmes showed improvements not only in motor activity but also in cognitive domains such as attention and memory. The findings of the present study confirmed these findings: patients in the intervention group who performed cognitive exercises during motor activity showed greater scores on the MoCA tests compared to the control group receiving standard therapy.

M. Avenali *et al.* [22] obtained comparable findings, focusing on the long-term effectiveness of physical therapy in patients with PD who have mild cognitive deficits. During the six-month follow-up period, statistically significant improvements in attention, information processing speed, and spatial orientation were recorded. Thus, physical interventions may have a preventive function against further cognitive deterioration. This is consistent with the current data on improvements in attention and orientation in the experimental group. According to a review by F. da Silva *et al.* [23], the most pronounced cognitive improvement in PD is observed when using combined aerobic and cognitive programmes. The researchers emphasised that the most efficacious protocols include tasks for attention, memory, and flexibility of thinking, which confirms the effectiveness of the multicomponent rehabilitation employed in the present study.

The current study demonstrated a significant improvement in balance, gait stability, and overall quality of life in the experimental group. D. Ferrazzoli *et al.* [24] obtained analogous findings, investigating the effect of multisensory stimulation in combination with motor training on patients with PD. The researchers noted that the combination of physical and cognitive activity has a synergistic effect, which is manifested in more pronounced functional improvements.

In their review, Z. Li *et al.* [25] confirmed that dual-task training markedly improves gait quality, balancem and cognitive performance, emphasising the role of these programmes in increasing functional autonomy. The researchers noted that reducing the cognitive load during gait contributes to more effective postural control. In this context, it is recommended to adapt training to the individual motor and cognitive characteristics of the patient. H. Gaßner *et*

*al.* [26] showed that even conventional physiotherapy and treadmill training improve dual-task walking ability, but according to the present study, supplementing the programme with cognitive modules enhances this effect. Notably, in both studies, the researchers concluded that without the cognitive element, improvements may be limited in time.

In contrast to conventional physical therapy, which is mainly focused on overcoming motor symptoms, modern approaches – both in the present study and in A. Petrelli *et al.* [27] – have demonstrated the benefits of integrating cognitive components. The researchers noted that a decrease in cognitive reserve can negatively affect the effectiveness of rehabilitation, and therefore individualising programmes based on the cognitive profile is a key success factor. The present study confirmed this hypothesis: patients with severe cognitive impairment who underwent an adapted programme showed marked improvement in both motor and cognitive areas.

Thus, the findings are in line with current trends in rehabilitation medicine and confirm the findings of earlier studies. At the same time, in contrast to a series of studies where cognitive exercises were considered as an auxiliary element, in the modified programme they became an integral part of therapy, which probably provided a more stable clinical effect. This suggests the feasibility of introducing such programmes into clinical practice to improve the quality of life of patients and optimise rehabilitation outcomes.

## Conclusions

The evaluation of the effectiveness of a modified physical therapy programme adapted to the cognitive status of patients with Parkinson's disease showed that the use of an individualised programme that included cognitive components enabled a substantial improvement in the physical condition of patients, a reduction in cognitive deficit, and an increase in their quality of life. The findings revealed that patients who took part in the modified programme showed a more pronounced improvement in all key indicators compared to the control group. Specifically, an improvement in motor function (reduced UPDRS III scores) was observed, as well as reduced TUG test time, improved BBS scores, a pronounced increase in quality-of-life domains (SF-36), and a decrease in symptom severity according to the PDQ-39 questionnaire. Additionally, patients in the experimental group showed an improvement in cognitive function, which further emphasises the comprehensive therapeutic effect of the adapted programme. The study found that the integration of cognitive components into the physical therapy programme creates an added positive effect, which lies not only in improving physical performance but also in reducing cognitive impairment. The following cognitive elements were used in the study: performing arithmetic tasks in motion (counting backwards), exercises to memorise visual and verbal stimuli during physical activity, spatial orientation with simultaneous motor activity, and the use of delayed response instructions to train executive functions and control attention. These cognitive-motor exercises were aimed at stimulating short-term memory, concentration, information processing speed, and flexibility of thinking. As a result, patients in the experimental group demonstrated not only an improvement in physical parameters (TUG, UPDRS, BBS), but also positive dynamics in the subjective PDQ-39 quality of life scale, particularly in the domains of memory, emotional state, communication, and social interaction. The PDQ-39 index decreased from 59.3% ± 3.4% to 48.7% ± 3.1%, which reflects an improvement in cognitive functioning and psycho-emotional adaptation of patients. Thus, cognitive integration in physical therapy was effective in improving both motor and higher mental functions.

Thus, the findings of the presented study reflect the feasibility of a tailored approach to the rehabilitation of patients with Parkinson's disease, particularly the value of accommodating the cognitive status. Conceptually, the findings emphasised the significance of an interdisciplinary approach in the rehabilitation of Parkinson's patients. They demonstrated that the combination of physical therapy with cognitive tasks can become an indispensable element of standard rehabilitation interventions for this category of patients. The use of cognitive training methods not only improves physical condition but also helps to reduce psycho-emotional difficulties, contributing to an increase in overall quality of life. Promising areas for further research include a detailed investigation of the optimal formats of cognitive motor training, adaptation of rehabilitation programmes depending on the severity of cognitive impairment, and long-term follow-up monitoring of the outcomes achieved.

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## Conflict of Interest

None.

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# Модифікація програми фізичної терапії з урахуванням когнітивних порушень у пацієнтів із хворобою Паркінсона

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**Анотація.** Хвороба Паркінсона є хронічним прогресуючим захворюванням, що супроводжується руховими та когнітивними порушеннями, які значно ускладнюють процес реабілітації та знижують якість життя пацієнтів. Метою даного дослідження було оцінити ефективність модифікованої програми фізичної терапії, адаптованої з урахуванням когнітивного статусу хворих. У дослідженні взяли участь 10 пацієнтів, які були розподілені на дві рівні групи: основну (n = 5), що проходила адаптовану програму з мультисенсорною стимуляцією, когнітивно-моторними вправами та уповільненим навчанням, і контрольну (n = 5), яка отримувала стандартну фізичну терапію. Для об'єктивної оцінки використовували тести: Timed Up and Go (TUG), UPDRS (моторна частина), Berg Balance Scale (BBS), PDQ-39 та SF-36. У результаті пацієнти основної групи продемонстрували позитивну динаміку за всіма показниками. Зокрема, час у тесті TUG зменшився з 16,8 ± 0,7 с до 13,2 ± 0,5 с, бал за UPDRS знизився з 42,5 ± 2,1 до 35,4 ± 1,9, показники рівноваги за BBS зросли з 38,5 ± 1,5 до 41,8 ± 1,3, а індекс якості життя за PDQ-39 покращився з 59,3 ± 3,4 % до 48,7 ± 3,1 %. Отримані результати свідчать про доцільність індивідуалізації реабілітаційних програм із врахуванням когнітивного профілю пацієнтів. Додавання когнітивних завдань до фізичної терапії не лише покращує моторні функції, а й сприяє зниженню когнітивного дефіциту та підвищенню загальної якості життя. Практична цінність дослідження полягає в можливості впровадження модифікованої програми фізичної терапії в клінічну практику, зокрема для мультидисциплінарних команд, що працюють у сфері нейрореабілітації, фізичних терапевтів, реабілітологів та лікарів-неврологів. Запропонований підхід може стати ефективним інструментом для підвищення функціональної незалежності пацієнтів з хворобою Паркінсона

**Ключові слова:** реабілітація; якість життя; мультисенсорна стимуляція; моторні симптоми; немоторні симптоми; когнітивна дисфункція