Mednarodno inovativno poslovanje
Journal of Innovative Business and Management

Integrating cognitive rehabilitation into comprehensive care for patients with multiple sclerosis: theoretical foundations, clinical practices, and future directions

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Abstract: Cognitive impairment is a common and significant feature of multiple sclerosis (MS), often present even in the early stages of the disease. Despite its prevalence, it frequently remains overlooked and inadequately addressed in clinical practice. This article explores contemporary approaches to cognitive rehabilitation in MS, emphasizing the integration of neuropsychological expertise, individualized treatment, and the role of interdisciplinary teams. Based on a literature review, it presents the main characteristics of cognitive changes, assessment approaches, and intervention strategies, including computer-assisted programs, metacognitive techniques, and ecologically oriented methods. The article advocates for the systematic incorporation of cognitive rehabilitation into routine practice and highlights the need for greater accessibility, standardized procedures, and research-driven development in the future.

Keywords: cognitive rehabilitation, multiple sclerosis, neuropsychology, cognitive reserve, interdisciplinary care
JEL classification: *I18, I12, I38*

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DOI 10.32015/JIBM.2025.17.1.6

Mednarodno inovativno poslovanje = Journal of Innovative Business and Management

ISSN 1855-6175

Integracija kognitivne rehabilitacije v celostno oskrbo bolnikov z multiplo sklerozo: teoretične osnove, klinična praksa in prihodnje usmeritve

Povzetek: Kognitivne motnje so pogost in pomemben vidik multiple skleroze (MS), pogosto prisotne že v zgodnjih fazah bolezni. Kljub svoji pogostosti pa so v klinični praksi pogosto prezrte in nezadostno obravnavane. Članek obravnava sodobne pristope h kognitivni rehabilitaciji pri MS, s poudarkom na vključevanju nevropsihološkega znanja, individualiziranem zdravljenju ter vlogi interdisciplinarnih timov. Na podlagi pregleda literature predstavi glavne značilnosti kognitivnih sprememb, pristope k ocenjevanju in intervencijske strategije, vključno z računalniško podprtimi programi, metakognitivnimi tehnikami in ekološko usmerjenimi metodami. Članek se zavzema za sistematično vključevanje kognitivne rehabilitacije v rutinsko prakso ter izpostavlja potrebo po večji dostopnosti, standardiziranih postopkih in raziskovalno podprtem razvoju v prihodnje.

Ključne besede: kognitivna rehabilitacija, multipla skleroza, nevropsihologija, kognitivna rezerva, interdisciplinarna oskrba

1 INTRODUCTION

Multiple sclerosis (MS) is a chronic, inflammatory, and neurodegenerative disease of the central nervous system, affecting approximately 2.8 million people worldwide (Walton et al., 2020). Although its most recognizable symptoms are often associated with motor functions, a significant proportion of patients also experience cognitive impairments that substantially impact daily functioning, social relationships, work capacity, and quality of life (Benedict et al., 2020). Cognitive decline in MS can occur early in the disease course and often progresses independently of physical disability, complicating its timely recognition and management.

Recent studies indicate that standard clinical scales, such as the Expanded Disability Status Scale (EDSS), do not capture subtle cognitive changes, which therefore often go unaddressed in routine clinical settings (Langdon et al., 2021). Findings on the association between volumetric brain changes and cognitive performance (Magdič, Hojs & Splicin, 2018), as well as the concept of cognitive reserve as a protective factor against the manifestation of cognitive decline (Rocca et al., 2019; Sumowski et al., 2018), further underscore the need for holistic and individualized care. Cognitive reserve refers to the brain's ability to maintain effective functioning despite the presence of neuropathology, a particularly relevant factor in chronic conditions such as MS.

Recent research has confirmed that brain atrophy in MS is strongly associated with the degree of cognitive impairment and other clinical outcomes. Simultaneously, the concept of cognitive reserve suggests that enriched life experiences and higher levels of education can provide some protection against the impact of brain damage on cognitive abilities. This implies that patients with greater cognitive reserve may retain better cognitive functioning despite similar levels of brain lesions or atrophy.

In recent years, increasing attention has been directed toward cognitive rehabilitation as a means of leveraging brain neuroplasticity through training and strategic interventions, potentially enhancing cognitive reserve and mitigating the cognitive consequences of neurological damage (Rocca et al., 2019; Longley, 2022). Cognitive rehabilitation encompasses various approaches—restorative, compensatory, and ecological—aimed either at improving impaired cognitive functions or at strengthening strategies to cope with everyday challenges. Nevertheless, despite the availability of interventions, their implementation in clinical practice is often hindered by a lack of systematic guidelines, specialized personnel, or infrastructure (Langdon et al., 2021).

The role of the neuropsychologist is particularly crucial, serving as a key figure in the assessment and rehabilitation of cognitive impairments in MS. In addition to conducting comprehensive diagnostics and assessing the patient's cognitive profile, the neuropsychologist actively contributes to the development of individualized rehabilitation plans and coordinates the interdisciplinary team. This enables a targeted treatment approach that addresses the patient's specific deficits while also considering their functioning, motivation, psychosocial context, and life goals. Furthermore, the neuropsychologist plays an important educational and consultative role—not only for patients and their families but also for other healthcare professionals—raising awareness about cognitive symptoms and effective therapeutic strategies.

This article offers a theoretical overview of contemporary approaches to cognitive rehabilitation in patients with MS. Special attention is given to the analysis of various rehabilitation models, effective interventions, individualized care based on cognitive profiles, and the role of the neuropsychologist in the interdisciplinary team. The aim is to bridge current scientific knowledge with clinical implications and to formulate recommendations for the integration of cognitive rehabilitation into routine MS care.

The research questions addressed in this article are: (1) What is the role of cognitive rehabilitation in the treatment of patients with MS? (2) Which theoretical models and approaches are used in contemporary rehabilitation practice? (3) What are the

recommendations for the effective implementation of cognitive rehabilitation in clinical practice?
The following sections begin with a historical overview of cognitive rehabilitation in MS, highlighting the evolution of the paradigm from early attempts to contemporary multidisciplinary approaches. This is followed by a methodological review explaining the literature selection and analytical approach, forming the basis for the subsequent analysis of empirical findings, case studies, and the development of clinical recommendations.

1.1 Historical Development of Cognitive Rehabilitation in Multiple Sclerosis

The origins of cognitive rehabilitation can be traced back to the 1960s and 1970s, when researchers began to recognize the importance of neuropsychological functioning in neurological diseases (Lezak et al., 1983). In its early stages, rehabilitation primarily focused on restoring lost functions following brain injuries, while multiple sclerosis remained on the periphery of interest due to its unpredictable course and heterogeneous symptoms.
A pivotal shift occurred in the 1990s with the advent of functional brain imaging (fMRI), which enabled a more nuanced understanding of the effects of MS on cognitive functioning (Filippi et al., 1998). Simultaneously, awareness began to grow that cognitive impairments were not merely secondary symptoms of the disease but constituted one of its core clinical challenges.
The first decade of the 21st century witnessed a surge in research examining the effects of specific interventions, gradually leading to the development of systematic protocols. A significant milestone was the creation of the Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS), which standardized cognitive assessment for MS patients at the international level (Benedict et al., 2012) and contributed to greater recognition of cognitive impairments in clinical practice.
In the past decade, cognitive rehabilitation has further evolved with the integration of computer-assisted programs, digital assessment tools, and the incorporation of telerehabilitation (De Meo et al., 2021). There is also an increasing focus on multidisciplinary approaches and ecological validity, reflecting the maturity of the field and its clinical relevance. Current trends emphasize the importance of early intervention, neuroplasticity, and the role of cognitive reserve as a protective factor (Sumowski et al., 2018).
This historical trajectory illustrates a clear progression from experimental models to comprehensively developed clinical programs, enabling more tailored interventions to meet the needs of individuals with MS.
Based on a review of existing literature, theoretical models, empirical findings, and clinical case studies, this article analyzes the role of cognitive rehabilitation in multiple sclerosis. It focuses on the significance of neuropsychological diagnostics, the selection of appropriate intervention strategies, challenges in clinical implementation, and the opportunities offered by emerging technologies. The objective is to formulate recommendations for a more systematic, accessible, and ethically grounded integration of cognitive rehabilitation into routine MS care.

1.2 Ethical Considerations in Cognitive Rehabilitation for Patients with Multiple Sclerosis

The implementation and delivery of cognitive rehabilitation for patients with multiple sclerosis (MS) raise a range of ethical issues that must be addressed within the framework of contemporary clinical practice. One of the key concerns is equity and accessibility of services. Despite the proven efficacy of cognitive rehabilitation, many patients lack equal access to appropriate care—whether due to geographic limitations, financial constraints, or a shortage of specialized personnel (World Health Organization, 2016). This challenges the principle of equal treatment and underscores the need for the development of alternative models, such as telerehabilitation.

Another critical issue is informed consent, particularly in patients with more pronounced cognitive impairments that may affect their understanding of therapeutic goals and procedures. Clinical professionals must ensure that patients or their legal representatives receive information in an understandable manner and are able to make decisions based on informed choice (Appelbaum, Lidz & Klitzman, 2009). This also entails understanding the limitations and potential inefficacy of certain interventions.
Stigmatization is also an important consideration. Since cognitive impairments are often invisible and misunderstood, patients may experience shame, self-doubt, or even workplace discrimination (Corrigan & Watson, 2002). Cognitive rehabilitation should therefore include psychosocial support to reduce feelings of isolation and enhance self-confidence. At the same time, it is essential to address common comorbidities such as depression and anxiety, which can further burden cognitive functioning (Boeschoten et al., 2017).
From an ethical perspective, rehabilitation must be designed to be individualized, transparent, and consistently monitored, with the inclusion of the patient's voice in all stages of treatment. Ethical sensitivity should also be embedded in research practices, where principles of privacy protection, voluntary participation, and non-maleficence must be strictly observed (Beauchamp & Childress, 2019).

1.3 Theoretical Models and Intervention Approaches in Cognitive Rehabilitation for MS

Cognitive rehabilitation in multiple sclerosis is grounded in three primary theoretical models: restorative, compensatory, and ecological. Each of these approaches originates from distinct conceptual foundations and targets specific aspects of cognitive functioning.

Restorative Approach

The restorative model is based on the premise that systematic training of impaired cognitive functions can restore their operation. Interventions are often computer-assisted (e.g., RehaCom, CogniFit, BrainHQ) and include tasks aimed at improving attention, memory, processing speed, and working memory. Evidence from neuroscience (Prosperini & Di Filippo, 2019) supports the notion that repeated training can lead to changes in functional brain connectivity, attributed to neuroplastic mechanisms.

Compensatory Approach

Compensatory strategies focus on teaching techniques that allow patients to successfully perform everyday tasks despite impaired functions. Examples include the use of external aids (reminders, diaries, apps), internal strategies (repetition, associations, visualization), and metacognitive training. Programs such as Goal Management Training (Levine et al., 2000) teach patients how to plan, organize, and consciously control their behavior.

Ecological Approach

Ecologically oriented rehabilitation is grounded in real-life contexts and involves tasks that simulate everyday situations. The goal is to facilitate the transfer of learned strategies into daily life through activities such as managing finances, cooking, or scheduling. This approach often involves occupational therapists and emphasizes the importance of context and functional goals. Research suggests that ecological approaches enhance the generalization of learned behaviors (Chiaravalloti & DeLuca, 2008).

Recommendations for Clinical Practice

Based on the review of the literature, empirical evidence, and practical case examples, the following recommendations can be formulated to enhance the effective implementation of cognitive rehabilitation in patients with multiple sclerosis:

- Systematic Cognitive Screening:

Regular assessment of cognitive functions using standardized tools, such as the Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS), should become an integral part of clinical care. This facilitates early identification of impairments and timely inclusion in rehabilitation programs.

- Individualized Approach:

Interventions should be based on comprehensive neuropsychological assessments and tailored to the patient's specific deficits, motivation, cognitive reserve, and life context.

- Multidisciplinary Team Model:

Optimal outcomes are achieved through the collaboration of a neuropsychologist, occupational therapist, speech and language therapist, physiotherapist, and psychologist. Coordinated communication among team members and with the patient is essential.

- Integration of Digital and Telerehabilitation Tools:

Technological solutions expand access and flexibility in cognitive rehabilitation, especially for patients in remote areas. The use of validated programs, such as RehaCom and BrainHQ, is recommended (De Meo et al., 2021).

- Support for the Psychological Aspects of Rehabilitation:

Interventions should incorporate strategies for addressing anxiety, depression, and loss of self-confidence, which often accompany cognitive decline in MS.

- Patient Involvement in Goal Setting:

Rehabilitation should be grounded in collaboration with the patient to establish realistic, functional goals, thereby enhancing motivation and long-term efficacy.

- Ongoing Research and Evaluation:

Longitudinal studies are needed to examine the effects of various approaches, along with the development of tools for monitoring long-term outcomes and cost-effectiveness of interventions.

2 METHODS

This article is based on a theoretical literature review focusing on cognitive rehabilitation in patients with multiple sclerosis. Data were drawn from selected scientific publications published from 2015 onward, with an emphasis on the most recent findings from 2020 onward. The search strategy employed key terms such as “cognitive rehabilitation,” “multiple sclerosis,” “neuropsychological assessment,” “cognitive reserve,” and “executive function.” The review also includes systematic reviews, meta-analyses, and clinical guidelines.

The description of the target population is based on patients with various forms of MS, with most studies focusing on relapsing-remitting MS (RRMS) and secondary progressive MS (SPMS). Patients with cognitive impairments most frequently exhibit deficits in attention, processing speed, memory, and executive functions (Chiaravalloti & DeLuca, 2008; Benedict et al., 2020).

Assessment methods include the use of standardized neuropsychological tests such as the Symbol Digit Modalities Test (SDMT), the Brief Visuospatial Memory Test-Revised (BVMT-R), and the California Verbal Learning Test (CVLT), all of which are part of the BICAMS battery—a brief international cognitive assessment system adapted for clinical use in MS (Langdon et al., 2021).
Rehabilitation approaches are categorized according to theoretical models: the restorative approach is based on training impaired cognitive functions; the compensatory approach focuses on strategy use and external aids; and the ecological approach emphasizes tasks that simulate real-life challenges. The literature describes a variety of programs, including RehaCom, BrainHQ, the Story Memory Technique, Attention Process Training, and contemporary telerehabilitation programs (De Meo et al., 2021).
Data integration is based on an analytical review of the evidence on the effectiveness of individual approaches, including findings from functional brain imaging studies that support neuroplastic changes following cognitive training (Prosperini & Di Filippo, 2019).

3 RESULTS

A review of the literature indicates that between 45% and 70% of patients with multiple sclerosis (MS) exhibit cognitive impairments, most commonly in the domains of processing speed, attention, memory, and executive function (Benedict et al., 2020; Langdon et al., 2021). These impairments can significantly impact daily life, especially because they are not always associated with physical disability and often remain undetected in the early stages of the disease.
Multiple studies confirm the effectiveness of various forms of cognitive rehabilitation. Computer-assisted interventions, such as RehaCom and BrainHQ, have demonstrated improvements in information processing speed and working memory (De Meo et al., 2021). The Story Memory Technique has proven effective in addressing memory deficits, particularly in learning and recalling verbal information (Chiaravalloti & DeLuca, 2008). Positive effects have also been observed in attention and metacognitive strategies, contributing to better day-to-day cognitive self-regulation.
In some clinical settings, cognitive rehabilitation has been successfully integrated into multidisciplinary centers, where patients simultaneously receive physical therapy, psychological support, and cognitive training. This model has been shown to be effective in promoting functional progress and improving quality of life, as supported by data from programs offering intensive, short-term interventions focused on everyday tasks (Prosperini & Di Filippo, 2019).
The effects of interventions are further supported by neuroimaging data, which demonstrate increased functional connectivity between brain regions following training—indicating the activation of neuroplasticity mechanisms (De Meo et al., 2021; Prosperini & Di Filippo, 2019). These findings underscore that cognitive rehabilitation is not solely a behavioral approach but also has a neurobiological basis that can be objectively monitored.
Overall, the results suggest that cognitive rehabilitation can lead to clinically significant improvements in cognitive functioning, especially when the approach is individualized, focused on specific deficits, and supported by interdisciplinary care. Despite the diversity of methods and interventions, the most pronounced effects are observed when rehabilitation is systematic and includes elements of motivation, progress tracking, and functional goal-setting.

3.1 Individual Case Studies

Case Studies: Individualized Approaches to Cognitive Rehabilitation in Patients with Multiple Sclerosis

To illustrate how theoretical concepts and empirical findings are translated into practice, we present three case studies demonstrating the diversity of cognitive rehabilitation approaches according to disease type, cognitive profile, and the patient's life context.

Case 1: Maja, Age 34 – RRMS and Telerehabilitation

Maja, a highly educated teacher with relapsing-remitting multiple sclerosis, reported difficulties with concentration, word-finding, and organizing daily tasks. After an initial relapse, her cognitive symptoms worsened, although her physical functioning remained relatively intact.
Following a referral to a neuropsychologist, a BICAMS assessment revealed significant deficits in processing speed and verbal memory. Maja was offered participation in a telerehabilitation program using the BrainHQ platform, where she performed cognitive tasks twice a week.
The program was individualized, including working memory training, visual-attentional orientation tasks, and metacognitive reflection through journaling. An occupational therapist also assisted her in creating a structured routine with digital reminders to manage daily activities.
After eight weeks, improvements were observed on the SDMT and CVLT tests, and Maja reported increased confidence at work and reduced feelings of cognitive overload. Telerehabilitation provided her with the flexibility she needed given her professional and family obligations.

Case 2: Ivan, Age 49 – SPMS and Multidisciplinary Center-Based Rehabilitation

Ivan, a former auto mechanic diagnosed with secondary progressive MS, was enrolled in a multidisciplinary rehabilitation program at a hospital-based center. He exhibited pronounced executive function deficits, particularly in planning, task switching, and frustration tolerance.
Initial neuropsychological assessment and MRI revealed marked fronto-subcortical atrophy. A combination of restorative and ecological approaches was selected. Ivan participated in group cognitive training involving tasks that simulated real-world situations (e.g., planning a trip with limited resources) and worked with a speech-language therapist to improve verbal fluency.
The team included a neuropsychologist, occupational therapist, psychologist, and nurse. Special emphasis was placed on social support and reducing isolation. After three months, improvements were observed in behavioral organization and execution of multi-step tasks.
Ivan reported feeling "useful" again after a long time, having taken on more responsibilities at home and becoming more active in his local community.

Case 3: Sara, Age 28 – Recent Diagnosis, High Cognitive Reserve

Sara is a young lawyer who was diagnosed with multiple sclerosis less than a year ago. Following her initial relapse, she did not experience significant motor impairments, but began to notice subtle difficulties in learning new information and recalling conversations.
Although her Expanded Disability Status Scale (EDSS) score did not indicate disease progression, a more detailed neuropsychological evaluation revealed early signs of reduced verbal fluency and attention. Sara was enrolled in a preventive cognitive support program, which included short training sessions focused on memory, attention, and dual-tasking techniques.
Due to her high cognitive reserve—characterized by a high level of education, active social life, and regular physical activity—she made rapid progress. She learned strategies for self-monitoring and recognizing fatigue, which helped her better organize her workday. A

psychologist played a key role in addressing early signs of anxiety associated with the diagnosis.

4 DISCUSSION

The findings of Magdič, Hojs, and Splicin (2018) confirm that brain volume loss in patients with multiple sclerosis is significantly associated with clinical rating scales, indicating a direct relationship between structural damage and the patient's functional state. Nevertheless, standard tools such as the EDSS often fail to detect subtle but clinically relevant cognitive changes. These impairments may emerge in the early stages of the disease and can affect daily functioning, autonomy, and quality of life.

In this context, the concept of cognitive reserve is particularly important. As Rocca and colleagues (2018) have shown, cognitive reserve functions as a protective factor against cognitive decline. Higher cognitive reserve, linked to enriched life experiences and education, can buffer the negative effects of regional and global brain atrophy on memory and verbal fluency. However, this protective effect diminishes as the disease progresses, emphasizing the need for early recognition of cognitive changes and timely inclusion in cognitive rehabilitation programs.

Cognitive rehabilitation in MS is based on various theoretical models, particularly the restorative and compensatory approaches (Mitolo et al., 2015). The former focuses on strengthening impaired cognitive functions through training, while the latter emphasizes learning strategies and using aids to help individuals overcome deficits. Recently, the ecological approach has gained increasing attention for its emphasis on integrating real-life scenarios into therapeutic tasks (Sumowski et al., 2018). A combined approach tailored to the individual’s needs has been shown to be the most effective.

Empirical evidence, including meta-analyses and randomized controlled trials, supports the efficacy of cognitive rehabilitation in MS. Interventions such as computer-assisted training, memory strategy instruction, attention exercises, and group-based rehabilitation have been shown to improve neuropsychological outcomes and quality of life (Rosti-Otajärvi & Hämäläinen, 2014; Chiaravalloti & DeLuca, 2008). The effectiveness of these methods is further corroborated by observed increases in functional brain connectivity, indicating neuroplasticity as a core mechanism of improvement (Prosperini & Di Filippo, 2019). Recent literature emphasizes the importance of individualized care and improved accessibility of cognitive rehabilitation services (Amatya et al., 2022).

A key determinant of rehabilitation success is individualization. Given the heterogeneity of cognitive profiles among MS patients, it is essential that therapy be based on detailed neuropsychological assessment. The approach must account not only for specific deficits but also for preserved abilities and factors such as cognitive reserve, motivation, and life context (Leavitt et al., 2018). Additionally, comorbid conditions such as fatigue, depression, or sleep disturbances must be addressed, as they significantly affect cognitive functioning (Glanz et al., 2018). These findings are supported by systematic reviews and meta-analyses confirming the efficacy of cognitive rehabilitation interventions (Latimer-Cheung et al., 2016).

The neuropsychologist plays a pivotal role in this process—not only in assessing cognitive status but also in guiding the entire rehabilitation process, participating in interdisciplinary teams, and providing feedback to patients (Longley, 2022). Optimal care involves collaboration among various professionals, including occupational therapists, physiotherapists, speech-language therapists, and clinical psychologists. An interdisciplinary approach enables cognitive rehabilitation to be integrated into comprehensive care, thereby increasing its effectiveness and sustainability (Chiaravalloti & DeLuca, 2008). The importance of structured integration of cognitive rehabilitation into standard care pathways is further supported by the official guidelines of the American Academy of Neurology (Miller et al., 2015).

In clinical practice, it is recommended to conduct regular cognitive screenings for patients with MS and to introduce appropriate interventions early in the disease course. Standardized

tools such as the SDMT should be used, and referrals to neuropsychologists should follow the identification of cognitive deficits (Glanz et al., 2018). Furthermore, accessible forms of rehabilitation, including telerehabilitation and online training, should be developed to increase service coverage and availability (Rosti-Otajärvi & Hämäläinen, 2014).
In conclusion, cognitive rehabilitation represents a key component of comprehensive care for individuals with multiple sclerosis. When grounded in theoretical models, empirical evidence, and a multidisciplinary and individualized approach, it has the potential to significantly improve patients' quality of life and functional integration into everyday life.

4.1 Implementation Challenges in Slovenia

Despite clear scientific evidence supporting the effectiveness of cognitive rehabilitation, its implementation in clinical practice in Slovenia remains limited. Barriers include a shortage of specialized professionals (particularly neuropsychologists), limited program availability outside tertiary institutions, and low patient involvement in setting rehabilitation goals. For effective integration, it would be appropriate to develop national guidelines based on international recommendations while taking into account the local healthcare system and available resources.

4.2 Potential of Digital Solutions in Slovenia

The digitization of healthcare services, including telerehabilitation, offers a promising opportunity to improve access to cognitive rehabilitation, particularly in rural or underserved regions. Successful implementation, however, requires user digital literacy, professional training, and robust data protection. Pilot projects in Slovenia could serve as a springboard for broader adoption of these solutions.

4.3 The Need to Bridge Science and Policy

Research findings should directly influence the development of healthcare policies and clinical guidelines. Currently, Slovenia lacks a systemic approach to integrating cognitive rehabilitation into standard MS care pathways—an oversight that represents a missed opportunity to improve functional outcomes and long-term quality of life for patients.

5 CONCLUSION

Cognitive rehabilitation constitutes a vital component of comprehensive care for individuals with multiple sclerosis. Given the prevalence and diversity of cognitive impairments—particularly those affecting attention, memory, and executive functions—therapeutic approaches must be systematic, holistic, and individually tailored. The role of neuropsychologists in clinical settings should be emphasized, along with the need to develop standardized protocols and improve access to services, including telerehabilitation.
Based on the review of literature, clinical case studies, and analysis of intervention efficacy, it can be concluded that cognitive rehabilitation significantly contributes to improved quality of life, work ability, and independence in individuals with MS. Early intervention, appropriate neuropsychological assessment, and the inclusion of interdisciplinary teams are critical. Digital tools and telerehabilitation are increasingly emerging as promising solutions to enhance the accessibility and sustainability of care.
However, certain methodological limitations must also be considered. A substantial proportion of studies are based on small sample sizes, long-term outcome data are often lacking, and methodological variability complicates cross-study comparisons. Therefore, future research should encourage larger randomized controlled trials that include assessments of cost-effectiveness, long-term outcomes, and impacts on quality of life.

Only by integrating cognitive rehabilitation as a standard element of MS care and by involving patients more actively in the design and evalupracticesation of therapeutic programs can the consequences of the disease be effectively managed and the daily lives of those affected be significantly improved.

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