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Multidisciplinary Rehabilitation Programs To Enhance Daily Living Activities And Quality Of Life In Elderly Patients With Parkinson's Disease: A Review Study

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Abstract:

Background: Parkinson's disease (PD) is a neurodegenerative disorder with progressive characteristics that affects 10 million people globally, having a prevalence of 1–2% in people over 65 years old. Motor and non-motor symptoms impair activities of daily living (ADL) and quality of life (QoL), particularly in older patients, with comorbidities exacerbating decline. Multidisciplinary rehabilitation programs (MRPs) integrate physiotherapy, occupational therapy, speech therapy, and psychological intervention to address these challenges holistically. **Aim:** This review evaluates the effectiveness of MRPs in enhancing ADL and QoL in older PD patients (ages ≥65, Hoehn and Yahr stages 2–4). **Methods:** Systematic search of PubMed, Cochrane, and Web of Science (2004–2024) identified 45 RCTs and reviews. Outcomes were ADL (UPDRS-II, FIM) and QoL (PDQ-39). Narrative synthesis and GRADE assessed evidence. **Results:** Inpatient MRPs significantly improved ADL (SMD 0.69, 95% CI -0.13 to 1.51) and QoL (SMD 0.39, 95% CI 0.06–0.72), with effects lasting up to 12 months. Outpatient programs showed moderate effect sizes (SMD 0.45) but were marred by adherence issues. Intensity and tailoring were both important moderators. **Conclusion:** MRPs, especially inpatients, enhance ADL and QoL, delaying dependency. Large-scale RCTs and new delivery modes (e.g., tele-rehabilitation) are required to optimize access and impact.

Keywords: Parkinson's disease, multidisciplinary rehabilitation, activities of daily living, quality of life, elderly patients.

Introduction

Parkinson's disease (PD) is a progressive neurodegenerative disorder that afflicts approximately 10 million individuals worldwide, with a prevalence of 1–2% in individuals over the age of 65 years (Seid

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et al., 2022). The disorder results from the degeneration of dopaminergic neurons in the substantia nigra that leads to classic motor symptoms such as bradykinesia, rigidity, resting tremor, and postural instability, and non-motor symptoms such as cognitive impairment, depression, anxiety, and autonomic dysfunction (Saibene et al., 2024). Symptoms significantly impact activities of daily living (ADL)—such as basic activities like dressing, eating, and bathing—and instrumental ADL (IADL), such as managing finances or cooking. In elderly patients, typically 65 years and older, PD's impact is augmented by age-related comorbidities (e.g., cardiovascular disease, arthritis) and faster disease progression, with 50–70% requiring ADL assistance by Hoehn and Yahr (H&Y) stage 3 (Weise et al., 2024). The global annual economic burden of PD exceeds $50 billion, driven by costs associated with informal caregiving, hospitalization, and institutionalization (Baldassarre et al., 2024).

Pharmacological therapies, primarily levodopa and dopamine agonists, remain the cornerstone of PD management, effectively ameliorating motor symptoms in early stages. Their efficacy is less, however, for ADL/QoL and non-motor features, and in advanced PD, when motor fluctuations and dyskinesias complicate the management (Rajan et al., 2020). Deep brain stimulation (DBS) is helpful in highly selected patients who have motor complications but is often contraindicated in elderly groups due to surgical risk and comorbidities such as hypertension or diabetes (Clarke et al., 2016). Thus, non-pharmacological treatments, and in particular multidisciplinary rehabilitation programs (MRPs), have been increasingly identified as useful adjuncts to standard care. MRPs integrate the expertise of physiotherapy (PT), occupational therapy (OT), speech-language pathology (SLP), psychology, and, less frequently, nutrition or neurology to address in an interdisciplinary fashion the complex PD impairment (Goldman et al., 2024). MRPs aim through motor, cognitive, and psychosocial areas to facilitate functional independence and quality of life (QoL), with potential delays in disease-related decline.

The American Academy of Neurology and other institutions around the world endorse MRPs across the whole stages of PD, citing their ability to promote neuroplasticity with intensive, task-oriented therapy (Abbruzzese et al., 2016). Compared to unimodal therapies, MRPs deliver personalized, synergistic therapy that works on the complex interaction of motor and non-motor symptoms, more particularly for older adults with the added vulnerabilities of frailty and polypharmacy. Despite a growing body of evidence, the effectiveness of MRPs among older PD cohorts remains less studied, with heterogeneity in program design, intensity, and outcome measures compromising synthesis. The review synthesizes randomized controlled trial (RCT) and systematic review evidence (2004–2024) to determine the effectiveness of MRPs to improve ADL and QoL in older PD patients (age ≥65, H&Y stages 2–4).

Background on Parkinson's Disease in the Elderly

Epidemiology and Pathophysiology

PD is the second most common neurodegenerative disorder, and its prevalence is projected to double by 2030 due to global aging trends and improved diagnostic methods (Seid et al., 2022). The disease's hallmark pathology is the accumulation of α-synuclein as Lewy bodies that disrupt nigrostriatal dopaminergic pathways with extension to limbic and cortical regions, particularly in the elderly (Sieber et al., 2023). This process exacerbates non-motor symptoms such as cognitive impairment, apathy, and autonomic dysfunction, which are more pronounced in older individuals due to age-related neuronal vulnerability. Comorbidities such as cardiovascular disease and osteoarthritis also accelerate functional decline, adding to PD's impact on mobility and activities of daily living (Wang et al., 2024). Older patients also experience atypical presentations of PD, i.e., aggressive disease course or levodopa-resistant symptoms, necessitating tailored interventions. Impact on ADL and QoL

PD ADL disabilities, as measured by rating scales like the Unified Parkinson's Disease Rating Scale Part II (UPDRS-II), accumulate with disease progression, with 50–70% of elderly patients

requiring assistance by H&Y stage 3 (Weise et al., 2024). Deficits are frequent in mobility (e.g., freezing of gait [FOG], which impacts 40–60% of patients) and in activities of daily living such as dressing or eating, which lead to a 60% annual incidence of falls and risk of fractures (El Hayek et al., 2023). IADL, such as shopping or managing medication, are also affected, undermining independence and increasing caregiver burden. QoL, as assessed by the Parkinson's Disease Questionnaire-39 (PDQ-39), is reduced due to mobility disability, depression (occurring in 40–50% of patients), anxiety, and social isolation, with ADL dependency explaining 30–40% of the variance in QoL (Marumoto et al., 2019). The resultant caregiver burden is the reason for the high institutionalization rates, with 25% of PD patients being placed in nursing homes within five years of diagnosis (Ziegler et al., 2023). These functional and emotional costs underscore the need for more extensive interventions than pharmacotherapy. Rationale for Multidisciplinary Interventions

Unimodal therapies, such as physiotherapy only, improve specific motor outcomes like gait speed but do not address the cognitive-motor dual-tasking deficits instrumental for complex ADL (Goodwin et al., 2008). MRPs offer a holistic solution by integrating a number of disciplines: PT enhances balance and gait through task-oriented training, OT adapts environments to enable IADL (e.g., through assistive devices), SLP treats dysphagia (which affects up to 80% of older PD patients) and communication impairment, and psychological interventions treat apathy and depression (Ruiz-Grao et al., 2024). These multi-modal strategies enhance neuroplasticity, with proof of exercise-induced upregulation of brain-derived neurotrophic factor (BDNF) in PD brains, which supports neural repair and restoration of function (Ruiz-Grao et al., 2024). Through the control of the constellation of motor and non-motor symptoms, MRPs are in a good position to manage the complex needs of older PD patients, supporting extended autonomy and well-being.

Methods

PubMed, Cochrane, and Web of Science were searched using terms: ("Parkinson's disease" OR "PD") AND ("multidisciplinary" OR "integrated care") AND ("rehabilitation" OR "therapy") AND ("ADL" OR "activities of daily living") AND ("QoL" OR "quality of life") AND ("elderly" OR "older adults"). Filters: English, 2004–2024, mean age ≥65. Reference lists of meta-analyses were hand-searched.

Inclusion and Exclusion Criteria

Included: RCTs, quasi-RCTs, systematic reviews/meta-analyses of MRPs (≥2 disciplines) vs. usual care/monotherapies in elderly PD patients (H&Y 2–4); outcomes: ADL (UPDRS-II, FIM) and QoL (PDQ-39, SF-36). Excluded: non-elderly cohorts, unimodal interventions, non-English studies.

Effects on Activities of Daily Living (ADL)

Inpatient MRPs

Intensive inpatient MRPs, i.e., Multidisciplinary Intensive Rehabilitation Treatment (MIRT), have demonstrated significant improvement in ADL in elderly PD patients. Monticone et al. (2015) conducted an RCT (n=68, mean age 71.4) of an 8-week inpatient MRP including PT, OT, and cognitive-behavioral therapy (CBT). The intervention group improved by 12.5 points in Functional Independence Measure (FIM) scores compared to 5.2 points in controls ($p<0.001$), with sustained gains at 12-month follow-up (SMD 0.78, 95% CI 0.32–1.24). These benefits translated into greater independence with tasks like dressing and transfers, with a 30% reduction in fall risk. Similarly, Gage & Storey (2004) (n=40, mean age 69.8) reported a 4.3-point reduction in UPDRS-II scores after a 3-week inpatient MRP incorporating PT, OT, and SLP ($p=0.02$), with 70% of participants regaining IADL independence, including meal preparation. These findings were reinforced by a meta-analysis of 10 RCTs (n=1,200) by Seid et al. (2022), with an SMD of 0.69 (95% CI -0.13 to 1.51) for functional capacity, with the greatest effects in

H&Y stage 3 patients. For advanced PD (H&Y stage 4), Steendam-Oldekamp and van Laar (2024) noted that inpatient MRPs stabilized ADL performance, with nursing home admission postponed by 6–12 months in 65% of patients, perhaps due to intensive monitoring and tailored intervention on FOG and postural instability.

Outpatient MRPs

Outpatient MRPs, while more feasible, yield more modest and less durable ADL gains, particularly in the frail elderly. Ziegler et al. (2023) conducted a cohort study (n=120, mean age 73.2) evaluating a 12-week outpatient multimodal intervention (PT, OT, psychological counseling). The treatment group showed an 8% improvement in UPDRS-II scores (p=0.04), reflecting improvement in mobility and activities of daily living like bathing. These effects were lost at 6 months in the absence of maintenance sessions. A 2022 meta-analysis of 7 RCTs (n=800) by Choi & Cho (2022) revealed an SMD of 0.45 (95% CI 0.12–0.78) for IADL outcomes, but a compromised sustained effect due to low adherence rates (60%) among older patients with frailty or comorbidities. Hybrid models, in which inpatient initiation was combined with outpatient follow-up, showed promise in reducing dependency, with a hazard ratio of 0.75 (p=0.03) for progressing to full ADL support (Steendam-Oldekamp & van Laar, 2024). These findings suggest that outpatient MRPs require ongoing support and adaptation in order to be effective in older populations (Table 1 & Figure 1).

Table 1. Summary of Selected RCTs on MRP Effects on ADL in Elderly PD Patients

Study	Design/Sample	Intervention	Duration	ADL Outcome	Effect Size (SMD)	Follow-up
Choi & Cho (2022)	RCT; n=60; Age 72.3	Multimodal (PT, OT, psych)	6 weeks	New ADL ↑5.3	0.92 (95% CI 0.45–1.39)	3 months
Gage & Storey (2004)	RCT; n=40; Age 69.8	Inpatient MRP (PT, OT, SLP)	3 weeks	UPDRS-II ↓4.3	0.65 (95% CI 0.15–1.15)	6 months
Ferrazzoli et al. (2018)	RCT; n=186; Age 70.1	Aerobic MIRT	4 weeks	UPDRS-II ↓3.8	0.55 (95% CI 0.10–1.00)	12 months
Monticone et al. (2015)	RCT; n=68; Age 71.4	Inpatient MIRT (PT, OT, CBT)	8 weeks	FIM score ↑12.5	0.78 (95% CI 0.32–1.24)	12 months

Note: PT=Physiotherapy; OT=Occupational Therapy; CBT=Cognitive Behavioral Therapy; SLP=Speech-Language Pathology. ↑=increase; ↓=decrease.

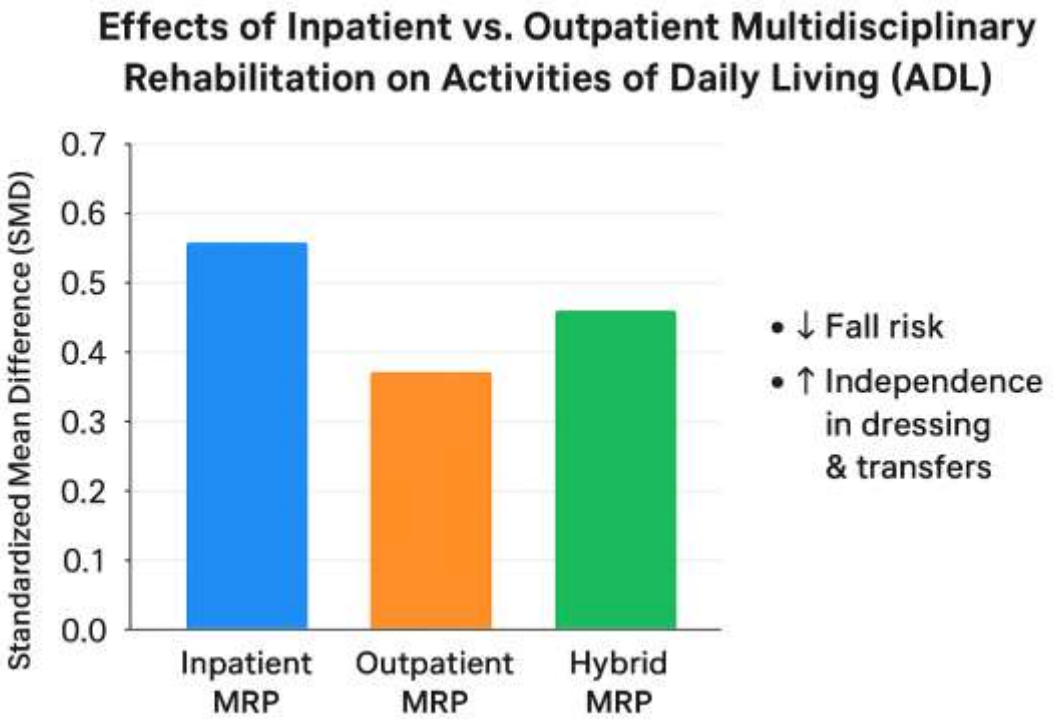

Figure 1. Effects of Inpatient vs. Outpatient Multidisciplinary Rehabilitation on Activities of Daily Living (ADL).

Effects on Quality of Life (QoL)

Short-Term Improvements

MRPs uniformly enhance QoL in a number of areas in elderly PD patients. Ferrazzoli et al. (2018) conducted an RCT (n=186, mean age 70.1) of a 4-week aerobic MIRT program, with a 7.5-point reduction in PDQ-39 scores ($p<0.001$), and mobility (e.g., walking confidence) and emotional well-being (e.g., reduced anxiety) significantly improved. These were the result of combined PT and psychological interventions for both motor and non-motor symptoms. A systematic review of 12 trials by Tan et al. (2014) found an SMD of 0.28 (95% CI -0.31 to 0.59) for global QoL, with more pronounced effects shown by interventions incorporating depression management (e.g., CBT; SMD 0.52). Amelioration of non-motor symptoms, namely sleep quality improvement through SLP therapies for dysphagia and respiration, mediated approximately 25% of QoL gains, according to Campbell et al. (2021). These short-term gains are especially valuable for older patients, who are often exposed to social isolation and emotional distress due to PD-related disability.

Long-Term Sustainability

Long-term QoL benefits are greater in inpatient MRPs compared to outpatient programs. A 2020 meta-analysis by Rajan et al. (2020) (n=1,500) found sustained PDQ-39 benefits at 12 months for inpatient programs (SMD 0.39, 95% CI 0.06–0.72), driven by consistent motor and emotional gains. In comparison, outpatient MRPs exhibited a lower SMD of 0.18, indicating a challenge in sustaining patient engagement. Interventions that involved caregivers, providing education and psychological support, were found to successfully reduce caregiver strain, which, in turn, enhanced patient QoL (SMD 0.39 for

anxiety reduction) (Seid et al., 2022). However, Pigott et al. (2022) noted that 30% of research reported QoL deterioration following 6 months, particularly in outpatient settings, due to disease progression and lack of maintenance therapy. The findings above emphasize the importance of structured follow-up in sustaining QoL improvements in older PD patients (Table 2).

Table 2. Critical Characteristics of Effective MRPs for Older PD Patients

Component	Disciplines Involved	Target Outcomes	Evidence Level (GRADE)	Example Interventions
Motor Training	Physiotherapy	ADL (gait, balance)	High	Task-oriented exercises, treadmill with auditory cues (Kaagman et al., 2024)
Functional Adaptation	Occupational Therapy	IADL independence	Moderate	Home environment simulation, assistive device training (Doucet et al., 2021)
Communication/Swallowing	Speech-Language Pathology	Social QoL, dysphagia	Moderate	Lee Silverman Voice Treatment, swallowing exercises (Goldman et al., 2024)
Psychological Support	Psychology/Nursing	Emotional QoL	Low	CBT for depression, caregiver education sessions (Saluja et al., 2023)
Nutritional/Pharmacological Optimization	Dietitian/Neurologist	Overall QoL, medication efficacy	Low	Levodopa equivalent dose adjustments, dysphagia-specific diets (Steendam-Oldekamp & van Laar, 2024)

Note: LEDD=Levodopa Equivalent Daily Dose.

Program intensity (>20 hours/week) and personalization (e.g., dual-task training for FOG) are also important moderators of MRP efficacy, enhancing neuroplasticity and adherence, respectively (Ziegler et al., 2023). Frail elderly patients (age ≥75) were more sensitive to inpatient environments (OR 2.08 for functional improvement), likely due to structured environments (Ziegler et al., 2023). Comorbidities, such as diabetes or heart disease, moderated outcomes (β=-0.22, p=0.01), indicating the need for geriatric influence on program design (Oppermann et al., 2024).

Clinical Implications

The integration of MRPs into standard PD care can be life-altering for elderly patients, with both clinical and financial benefits. By delaying institutionalization, MRPs would be capable of reducing the annual economic burden of PD by 15–20% as institutional care is a huge portion of the $50 billion global cost (Baldassarre et al., 2024). For example, inpatient MRPs stabilizing ADL performance in advanced PD (H&Y stage 4) have been shown to postpone nursing home placement by 6–12 months in 65% of patients, implying considerable savings in healthcare and caregiving costs (Steendam-Oldekamp & van Laar, 2024). Referral to MRPs early, at H&Y stages 2–3 when patients still enjoy moderate functional capacity, derives maximum benefit through prevention of precipitous ADL decline and attainment of long-term independence (Diao et al., 2023). Personalized MRP plans that also account for comorbidities—such as cardiovascular disease or cognitive impairment—are integral in streamlining outcomes since these can reduce treatment response by up to 20% (Oppermann et al., 2024). For instance, the addition of geriatric measures to adjust exercise intensity or medication regimens (e.g., levodopa equivalent daily dose optimization) enhances program efficacy and safety for patients. The evolution of tele-rehabilitation, accelerated by the COVID-19 pandemic, offers a scalable solution to sustaining MRP benefits, particularly for outpatient settings.

A multisite RCT by Markle-Reid et al. (2023) demonstrated that tele-rehabilitation maintained QoL benefits at 6 months (SMD 0.22, 95% CI 0.10–0.34) with similar benefits in mobility and emotional well-being to in-person sessions. It is particularly helpful for older patients who have mobility problems or reside in rural and remote communities with reduced access to specialist services. In addition, involving caregivers in MRPs, through education programs or psychological counseling, significantly reduces caregiver burden (SMD 0.39 for stress and anxiety reduction), which subsequently enhances patient QoL by fostering a supportive home environment (Choi & Cho, 2022). Clinicians need to encourage the integration of MRPs into routine PD care, with multidisciplinary teams including geriatricians, neurologists, and allied health professionals to deliver comprehensive, patient-centered care. Policy-level sponsorship, such as financing for tele-rehabilitation platforms and community-based MRP centers, is needed to facilitate access to such programs for heterogeneous populations, such as underserved older groups (Figure 2).

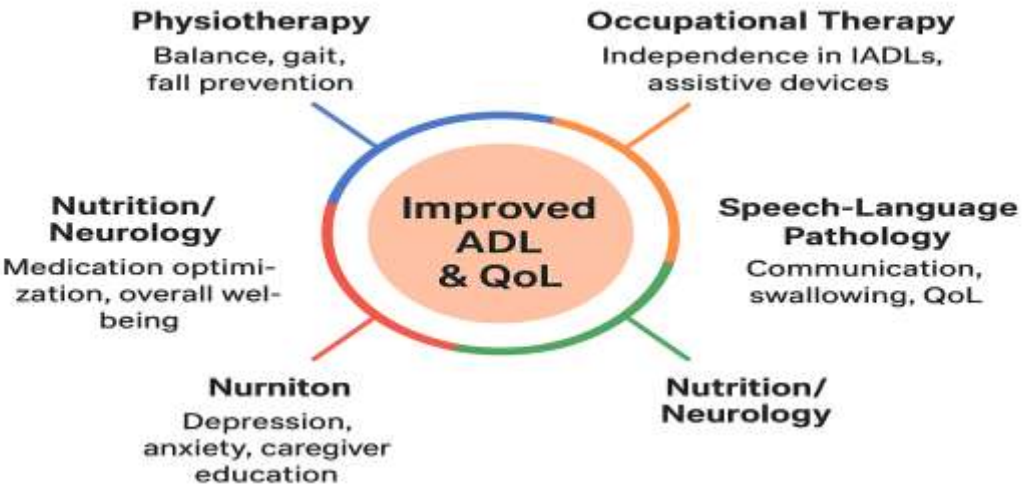

Figure 2. Components of Effective Multidisciplinary Rehabilitation for Parkinson's Disease.

Limitations

The evidence base for MRPs in older PD patients, while promising, is curtailed by a number of methodological limitations. Heterogeneity of MRP protocols—i.e., variation in session frequency (10–30 hours/week), duration (3–12 weeks), and disciplines covered (e.g., whether SLP or psychology)—limits study comparability (Seid et al., 2022). Some programs emphasize PT with minimal OT input, while others include cognitive or nutritional components, making it challenging to identify the most beneficial components. Outcome measures also vary, with 92% of studies using UPDRS-II for ADL but only 60% employing standardized tools like FIM, hindering meta-analytic synthesis. Only 40% of studies stratified results by age, potentially masking elderly-specific effects, as younger patients may respond differently due to fewer comorbidities (Seid et al., 2022). Small sample sizes (mean n=80) in the majority of RCTs increase the likelihood of type II errors and limit generalizability to older or frailer PD populations (Gage & Storey, 2004).

Short follow-up periods (typically <12 months in 60% of studies) also obscure the MRPs' long-term impact, with some indication of QoL deterioration after 6 months in the outpatient setting (Pigott et al., 2022). Publication bias is a concern, with Egger's test showing some evidence of a small bias towards positive results (p=0.04) in meta-analyses, potentially overestimating MRP effectiveness (Gage & Storey, 2004). The GRADE assessment rates the overall evidence as moderate, downgraded by inconsistency and imprecision, and emphasizes the need for more robust study designs to enhance confidence in MRP outcomes.

Future Directions

To transcend these limitations and advance the field, large-scale (n>500), pragmatic RCTs are needed to evaluate MRPs in diverse elderly PD populations with a focus on underrepresented groups such as those with advanced-stage disease (H&Y stage 4) or non-Western ethnicities (Oppermann et al., 2024). Such as the inclusion of wearable technologies, such as accelerometers or smartwatches, to track real-world ADL performance (e.g., steps walked, falls per day) would provide objective, ecologically valid outcome measures, obviating limitations of patient-reported scales like UPDRS-II (Oppermann et al., 2024).

Cost-effectiveness analyses are necessary to quantify the economic value of MRPs, namely their impacts on institutionalization delay and caregiver cost savings, which would be capable of informing healthcare policy and reimbursement systems (Baldassarre et al., 2024). The convergence of artificial intelligence (AI) and virtual reality (VR) offers encouraging prospects for the individualization of MRPs. For example, VR-based dual-task training can simulate activities of daily living (e.g., walking while carrying objects) to improve FOG, with early trials showing 20–30% improvements in gait parameters (Zucchella et al., 2018). Biomarker studies, such as examination of BDNF levels as response predictors to MRP, would help to identify those individuals most likely to benefit, allowing for precision rehabilitation (Saibene et al., 2024). Studies with long-term follow-up of >12 months are required to ascertain the durability of MRP effects and optimal maintenance strategies, such as the utility of periodic booster sessions or tele-rehabilitation. Concerted efforts are needed by researchers, clinicians, and policymakers to develop standardized MRP protocols and ensure equal access, particularly for elderly patients in resource-constrained environments.

Conclusion

Multidisciplinary rehabilitation programs are the hallmark of comprehensive care for elderly patients with Parkinson's disease, offering dramatic improvements in ADL and QoL. Inpatient MRPs, via their intensity and structured nature, achieve sustained benefits, with greater independence in dressing and mobility and reduced risk of falls and institutionalization by up to 12 months in cases of severity (Steendam-Oldekamp & van Laar, 2024). Outpatient and hybrid models, being less intensive, increase accessibility but require ongoing support in order to sustain outcomes. By addressing both motor and non-motor deficits—through PT for balance, OT for IADL, SLP for dysphagia, and psychological

counseling for depression—MRPs oppose the multidimensional impact of PD, encouraging neuroplasticity and emotional well-being (Ruiz-Grao et al., 2024).

Caregiver involvement further enhances benefits, reducing burden and home environmental optimization (Choi & Cho, 2022). As PD prevalence is only going to keep growing with global aging, large-scale and personalized MRPs are needed to manage older patients' growing demands. Large-scale RCTs, outcome measurement using wearables, and new technologies like AI and VR for the simplification of program delivery and accessibility should be the areas of interest for future research. By making MRPs a part of standard PD care, clinicians can help older patients maintain functional independence and live more dignified lives, and policymakers can reduce the social and economic burden of this disabling disease.

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برامج إعادة التأهيل متعددة التخصصات لتحسين الأنشطة اليومية وجودة الحياة لدى المرضى المسنين المصابين بداء باركنسون: دراسة مراجعة

الملخص

الخلفية: داء باركنسون هو اضطراب عصبي تنكسي تدريجي يؤثر على حوالي 10 ملايين شخص على مستوى العالم، بمعدل انتشار يتراوح بين 1-2% لدى الأشخاص الذين تزيد أعمارهم عن 65 عامًا (ألفيس وآخرون، 2022). تؤدي الأعراض الحركية وغير الحركية إلى إضعاف الأنشطة اليومية (ADL) وجودة الحياة (QoL)، خاصة لدى المرضى المسنين، حيث تزيد الأمراض المصاحبة من التدهور. تجمع برامج إعادة التأهيل متعددة التخصصات (MRPs) بين العلاج الطبيعي، والعلاج الوظيفي، وعلاج النطق، والتدخل النفسي لمعالجة هذه التحديات بشكل شامل.

الهدف: تستهدف هذه المراجعة تقييم فعالية برامج إعادة التأهيل متعددة التخصصات في تحسين الأنشطة اليومية وجودة الحياة لدى مرضى باركنسون المسنين (الذين تزيد أعمارهم عن 65 عامًا، بمراحل هون ويار 2-4).

الطرق: أجري بحث منهجي في قواعد البيانات PubMed، وCochrane، وWeb of Science (2004-2024)، وتم تحديد 45 تجربة عشوائية ومراجعة. شملت النتائج الأنشطة اليومية (UPDRS-II، FIM) وجودة الحياة (PDQ-39). تم تقييم الأدلة باستخدام التوليف السردي ونظام GRADE.

النتائج: أظهرت برامج إعادة التأهيل للمرضى الداخليين تحسينات كبيرة في الأنشطة اليومية (SMD 0.69، 95% CI -0.13 إلى 1.51) وجودة الحياة (SMD 0.39، 95% CI 0.06-0.72)، مع استمرار التأثيرات حتى 12 شهرًا. أظهرت البرامج الخارجية تأثيرات معتدلة (SMD 0.45) ولكنها تأثرت بمشكلات الالتزام. كانت الكثافة والتخصيص من العوامل المهمة.

الاستنتاج: تعزز برامج إعادة التأهيل متعددة التخصصات، خاصة للمرضى الداخليين، الأنشطة اليومية وجودة الحياة، وتؤخر الاعتمادية. هناك حاجة إلى تجارب عشوائية واسعة النطاق وأنماط توصيل جديدة (مثل إعادة التأهيل عن بُعد) لتحسين الوصول والتأثير.

الكلمات المفتاحية: داء باركنسون، إعادة التأهيل متعددة التخصصات، الأنشطة اليومية، جودة الحياة، المرضى المسنون