

Can Moving to the Music Shake Off Parkinson's? Dance Therapy for Motor, Cognitive, and Affective Functioning in Parkinson's Disease Patients

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ABSTRACT

Parkinson's disease is a progressive neurodegenerative disorder that impacts multifaceted domains of functioning. Simultaneously impairing motor, cognitive, and affective performance, the disease significantly degrades the quality of individuals' daily lives. Current treatments are largely pharmacological, and although they alleviate symptoms, they do not cease disease progression and are often associated with major complications and adverse effects. This prompted a growing interest in non-pharmacological interventions that address the complex, multidimensional nature of the disease. Therefore, this narrative review synthesizes existing literature on the effects of dance therapy as a complementary intervention for individuals with Parkinson's disease. Within the literature investigating dance therapy for patients with mild to moderate disease severity, significant improvements in motor, cognitive, and affective outcomes have been reported. In addition to demonstrating greater degrees of improvement in several areas compared to those observed in some traditional rehabilitation approaches, dance therapy may provide additional benefits in domains not typically targeted by conventional rehabilitation. As a result, dance therapy shows promise as a multidimensional, complementary intervention in the management of Parkinson's disease.

INTRODUCTION

Parkinson's disease is a progressive neurodegenerative disorder with debilitating short-term and long-term consequences at both the individual and societal levels. It is characterized by symptoms of impaired motor control caused by the loss of dopaminergic neurons in the substantia nigra, a region of the midbrain (Kalia and Lang, 2015). Current criteria define Parkinson's disease as the presence of bradykinesia—an extreme slowness of movement and reflexes—combined with either resting tremor, rigidity, or both (Bloem, Okun and Klein, 2021). Resting tremor is defined as an involuntary, rhythmic shaking that occurs when a muscle is relaxed, and rigidity is defined as an involuntary, constant stiffness or inflexibility of muscles. Many patients with Parkinson's disease commonly experience progressive gait instability, impaired postural control, and complications such as tardive dyskinesia—involuntary, repetitive body

movements such as grimacing, lip-smacking, or rapid eye blinking—leading to increasing difficulty in performing activities of daily living (Camargo et al., 2024). However, cognitive and affective functioning are also immensely impacted. Cognitive impairment in the domains of memory, executive, and visuospatial functions, such as difficulties with planning, recall, and spatial navigation, is commonly documented in patients with Parkinson's disease. Affective disorders, most notably depression, are also highly prevalent (Poletti, De Rosa and Bonuccelli, 2012). Together, these cognitive and affective impairments compromise decision-making, emotional regulation, and social functioning, resulting in reduced independence and diminished overall quality of life for patients. Much more than just a motor disorder, Parkinson's disease affects multiple domains of functioning that extend beyond movement alone.

Parkinson's disease follows a progressive pattern of neurodegeneration affecting specific brain regions and cell types. Early pathological changes are associated with the accumulation of misfolded α -synuclein protein within neurons, which may occur decades before diagnosis, forming Lewy bodies (Braak et al., 2003). These abnormalities are thought to initially involve lower brainstem and olfactory structures, corresponding with early non-motor symptoms such as autonomic dysfunction and loss of smell (Zafar, Lui and Yaddanapudi, 2026). These symptoms often appear five to ten years before diagnosis. As the disease progresses, degeneration becomes pronounced in dopaminergic neurons of the substantia nigra pars compacta (Kalia and Lang, 2015). The substantia nigra plays a critical role in basal-ganglia-thalamocortical circuits that regulate both voluntary movement and executive processes. The resulting depletion of dopamine in this region disrupts these circuits, leading to the emergence of motor symptoms like bradykinesia, rigidity, and rest tremor. Parkinson's disease is typically diagnosed when these symptoms appear. Although dopamine is widely associated with reward processing, it also regulates neural signaling and plasticity. Because basal ganglia networks project beyond motor cortices to the prefrontal cortex and limbic regions, dopaminergic degeneration also contributes to impairments in executive functioning, decision-making, and emotional regulation (Macedo et al., 2025). These symptoms progressively worsen over time and are often more severe in the later stages of the disease, typically a decade after diagnosis (Mack and Marsh, 2017).

With over 10 million individuals living with Parkinson's disease around the world, Parkinson's disease poses a major concern for public health worldwide (Statistics | Parkinson's Foundation, 2026). Beyond its clinical burden, Parkinson's disease imposes substantial economic costs at both individual and societal levels. Direct medical expenses, including long-term pharmacological treatment, specialist consultations, and hospitalizations, on top of indirect costs of informal caregiving and assisted living cause considerable lifetime financial strain. In the US, combined direct and indirect costs reached \$52 billion annually in 2020, rising to an estimated \$61.5 billion in 2025 due to inflation (Statistics | Parkinson's Foundation, 2026). Progressive functional decline often results in increased dependency on caregivers, reduced workforce participation, and premature retirement, contributing to loss of productivity and decreased economic output. Furthermore, the incidence of Parkinson's disease is expected to increase substantially in the coming decades due to aging populations. An estimated 25.2 million people are projected to be living with Parkinson's disease worldwide in 2050, portraying a 112% increase from 2021, presenting

healthcare systems with a significant challenge for the future (Su et al., 2025). Collectively, these clinical and functional consequences impose considerable caregiver burden, increase long-term healthcare expenditures, and contribute to broader socioeconomic costs, underscoring the urgent need for comprehensive and sustainable therapeutic strategies.

Currently, treatments for Parkinson's disease are largely pharmacological, commonly employing medications that potentiate dopaminergic signaling in the brain. One such pharmacological treatment is Levodopa. Levodopa remains one of the most effective and widely used pharmacological treatments for Parkinson's disease. As the metabolic precursor of dopamine, levodopa crosses the blood-brain barrier and is converted into dopamine within surviving neurons, thereby compensating for dopaminergic depletion. As a result, levodopa effectively alleviates bradykinesia and other cardinal motor symptoms, often resulting in marked short-term improvements in mobility and functional performance (Kim and Lee, 2025). Other pharmacological treatments for Parkinson's disease include dopamine agonists such as pramipexole, ropinirole, and rotigotine. These are often used alongside levodopa in the early stages to reduce motor fluctuations (Kim and Lee, 2025). However, while existing treatments alleviate symptoms, no therapy currently halts or reverses disease progression. Despite this, there have been significant research efforts focused on disease-modifying therapies targeting α -synuclein. One such agent targeting α -synuclein, prasinezumab, has progressed into Phase III clinical trials (Roche, 2025). Although early findings suggest potential slowing of motor progression, definitive evidence demonstrating meaningful disease modification remains under investigation.

Although current pharmacological treatments are, to some degree, beneficial and play a crucial role in many patients' functional independence and overall well-being, they also come with significant drawbacks. Prolonged levodopa use has been reported to cause irreversible motor function complications, including levodopa-induced dyskinesias. Excessive dopaminergic stimulation in mesolimbic and cortical pathways, beyond the intended motor circuits, may also contribute to neuropsychiatric side effects. Patients may therefore experience adverse side effects like confusion, hallucination, psychosis, and agitation (Lee and Yankee, 2021). Additional side effects such as nausea, dizziness, headaches, and somnolence are also highly prevalent among patients receiving long-term levodopa therapy (Gandhi and Saadabadi, 2025). As a result, non-pharmacological interventions that could help manage symptoms and daily functioning may offer significant value.

In more recent years, movement-based therapies have gained attention as potential treatments for Parkinson's disease. These non-pharmacological therapies are most commonly delivered with a dual therapeutic framework alongside pharmacological treatment, particularly dopaminergic medications. Through focusing on motor control, these approaches aim to improve symptoms and the overall well-being of patients with Parkinson's disease without increasing medication dosage. Among these non-pharmacological therapies, physiotherapy and structured exercise programs have been commonly introduced in the early to moderate stages of the disease (HongFei et al., 2024). These treatments have shown measurable improvements in gait, balance, and muscle rigidity, reducing caregiver burden and improving quality of life (Choi et al., 2020). However, these approaches are traditionally

one-dimensional, emphasizing physical symptom management while overlooking the broader cognitive and affective challenges associated with Parkinson's disease.

On the other hand, dance therapy has emerged as an alternative approach to target the systems affected by Parkinson's disease. Integrating physical movement, rhythm, cognitive engagement, emotion, and social interaction, dance therapy shows promise in supporting patients with Parkinson's disease. Several studies have applied dance-based interventions in patients with Parkinson's disease, with some reporting improvements not observed with conventional exercise. These outcomes suggest that the multidimensional nature of dance may engage broader neurological systems not typically involved in conventional exercise programs. However, current research often examines these benefits separately, with many studies focusing primarily on either motor, cognitive, or affective outcomes. As a result, the underlying mechanisms of dance therapy and the relationships between these domains remain insufficiently understood. Therefore, this review aims to synthesize findings across existing literature to investigate the effects of dance therapy on motor, cognitive, and affective functioning, and to explore potential underlying mechanisms linking these domains. Using standardized quantitative motor, cognitive, and affective metrics, this review examines available comparisons between dance therapy and conventional rehabilitation approaches, while considering how intervention characteristics, including style, duration, and frequency, may influence outcomes.

REVIEW METHODOLOGY

A narrative review approach was used to synthesize existing literature examining the effects of dance therapy on motor, cognitive, and affective outcomes in individuals with Parkinson's disease. Relevant studies were identified through searches of electronic databases, including Google Scholar and PubMed. The literature search included combinations of keywords related to Parkinson's disease and dance-based interventions, including "Parkinson's disease," "dance therapy," "dance intervention," "dance movement therapy," "motor function," "cognitive function," "depression," and "quality of life."

Only studies published from 2010 onwards were considered for inclusion. Studies were included if they investigated individuals diagnosed with Parkinson's disease and evaluated the effects of a dance-based intervention on clinical outcomes related to motor, cognitive, or affective functioning. Studies were also selected if they provided quantitative assessments of outcomes using standardized clinical measures, allowing comparison of changes following intervention. Studies were excluded if they did not involve individuals with Parkinson's disease, did not evaluate dance-based interventions, or did not assess outcomes related to motor, cognitive, or affective functioning. Review articles, editorials, and studies without sufficient clinical outcome data were excluded.

Studies were selected based on their relevance to the objectives of this review, with emphasis placed on research examining the multifaceted effects of dance therapy across motor, cognitive, and affective domains. Studies were chosen to provide a balanced representation of outcomes across these three

domains. Additionally, studies comparing dance therapy with traditional rehabilitation approaches were included where available to provide further insight into the clinical relevance of dance therapy. A summary of the characteristics and key findings of the included studies is presented in Table 1.

Table 1. Summary of studies included in this narrative review.

Study	Style	Sample Size (n)	Overall Duration	Session Duration (minutes)	Frequency per week	Motor Outcomes	Cognitive Outcomes	Affective Outcomes
Haputhanthirige et al. (2023)	Dance for PD program	n = 33 (Dance: 17; Control: 16)	12 weeks	60	2	Gait velocity: Improved Cadence: Improved Step length: Improved Dual-task gait: Improved	—	—
Kang et al. (2022)	Feldenkrais Method	n = 12	6 months	60	1	Gait velocity: Improved Step length: Improved 6-month follow-up: Improvements not maintained	—	—
de Natale et al. (2017)	Argentine Tango	n = 16 (Dance: 9; Rehabilitation: 7)	10 weeks	60	2	TUG: Improved 6MWT: Improved MDS-UPDRS Part III: No significant change GDI: No significant change	TMT-A: Improved TMT-B: Improved FAB: No significant change Stroop Test: No significant change	—
Duarte et al. (2023)	Baila Parkinson method	n = 13	24 weeks	50	2	Balance: Improved Gait: Improved	Executive function: Improved	MADRS: Improved PDQ-39: Improved
Hashimoto et al. (2015)	Aerobic, jazz, tango, and classical ballet-based dance	n = 46 (Dance: 15; Rehabilitation: 17)	12 weeks	60	1	TUG: Improved BBS: Improved	FAB: Improved MRT response time: Improved MRT score: No significant change	SDS: Improved AS: Improved

Can Moving to the Music Shake Off Parkinson's? Dance Therapy for Motor, Cognitive, and Affective Functioning in Parkinson's Disease Patients

		Control: 14)						
Prewitt et al. (2017)	Partner, group, and line dances	n=6	8 weeks	60	2	—	SCOPA-COG (executive function): Improved SCOPA-COG (verbal recall): No significant change SCOPA-COG (visuospatial): No significant change	GDS: No significant change S&E ADL: Improved
Kalyan i et al. (2019)	Dance for PD program	n = 33 (Dance: 17; Control: 16)	12 weeks	60	2	—	TMT B-A: Improved TMT-B: Improved Auditory Verbal Learning Test: Improved Picture Sequence Memory Test: No significant change	HADS: Improved MDS-UPDR S Part I: Improved PDQ-39: Improved
Roopr ai et al. (2026)	Dance for PD program	n = 71 (Dance: 43; Control: 28)	6 years	75	1	—	MMSE: Improved (Years 2–5)	—

Note: "Improved" indicates a statistically significant improvement reported by the study. "No significant change" indicates that no statistically significant difference was observed.

Abbreviations: 6MWT = 6-Minute Walk Test; AS = Apathy Scale; BBS = Berg Balance Scale; FAB = Frontal Assessment Battery; GDS = Geriatric Depression Scale; HADS = Hospital Anxiety and Depression Scale; MADRS = Montgomery–Åsberg Depression Rating Scale; MDS-UPDRS = Movement Disorder Society-Sponsored Revision of the Unified Parkinson's Disease Rating Scale; MMSE = Mini-Mental State Examination; MRT = Mental Rotation Task; PDQ-39 = Parkinson's Disease Questionnaire-39; SDS = Self-Rating Depression Scale; S&E ADL = Schwab and England Activities of Daily Living; TMT = Trail Making Test; TUG = Timed Up and Go.

MOTOR OUTCOMES

Motor impairment is one of the most prominent and debilitating features of Parkinson's disease, commonly manifesting as bradykinesia, rigidity, tremor, and impaired gait. Because these symptoms significantly affect mobility and independence, improving motor function remains a central goal of

therapeutic interventions for Parkinson's disease. As a result, many studies investigating dance therapy evaluate its potential to improve motor performance in individuals with Parkinson's disease.

Motor Assessments and Disease Stages

Studies examining the motor effects of dance therapy typically employ quantitative methodologies using standardized motor outcome assessments. Commonly used motor outcome assessments include the Movement Disorder Society-Sponsored Revision of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS) and the Tinetti Scale to evaluate motor symptom severity before and after dance therapy. The MDS-UPDRS consists of four components, with Part III specifically quantifying motor symptom severity through the examination of 18 motor items. These items include rigidity, leg agility, gait, postural stability, and rest tremor amplitude (Goetz et al., 2007). In contrast, the Tinetti scale focuses more specifically on quantifying balance and gait performance in the elderly. It includes measures of static, dynamic, reactive, and anticipatory balance, as well as ambulation and transfer ability (Curcio et al., 2016). Most studies on dance therapy for patients with Parkinson's disease rely on these objective motor metrics.

Disease severity in Parkinson's disease is commonly classified using the Hoehn and Yahr scale. The Hoehn and Yahr scale is a widely used system that categorizes disease progression from Stage I, unilateral involvement, to Stage V, wheelchair bound or bedridden unless aided (Clarke et al., 2016). Stages I-III are generally considered to represent mild to moderate severity. Across all included studies, participants consisted of individuals with mild to moderate Parkinson's disease, classified within Hoehn and Yahr stages I-III.

Dance Style and Motor Outcomes

Dance therapy vary in style across studies, ranging from ballet and contemporary dance to tango and specialized programs specifically designed for individuals with Parkinson's disease. Dance styles studies have used include the Dance for PD program, the Feldenkrais method, the Baila Parkinson method, and tango. These styles differ in their movement characteristics as well as the aspects of motor function they aim to target. The Dance for PD program is a specialized program designed to help people with Parkinson's disease improve their balance, flexibility, coordination, and strength. It includes aspects of ballet, modern dance, choreographic repertory, jazz, tap, Flamenco, and Scottish Dance (Haputhanthirige et al., 2023). The Feldenkrais method is a type of movement therapy designed to improve posture, flexibility, and coordination (Kang et al., 2022). The Baila Parkinson method consists of progressive movement sequences created by the combination and adaptation of choreographic elements from different dance styles, including tango, ballroom dance, urban dances, samba, ballet, contemporary dance, and regional dances (Duarte et al., 2023). Argentine Tango, which is the primary form of tango used in Parkinson's disease research, is a partnered dance that places more emphasis on connection than other forms of tango (de Natale et al., 2017).

Across all dance therapy styles, significant improvements in motor functioning were shown. The Dance for PD program intervention, which consisted of 1-hour sessions conducted twice weekly over 12 weeks, demonstrated significant improvements in gait velocity, cadence, and step length, including under dual-task conditions. Similarly, the Feldenkrais method, consisting of 1-hour sessions conducted once weekly over a 6-month period, showed improvements in gait velocity and step length. However, these improvements observed during the intervention period were not maintained at a follow-up 6 months after dance therapy had ended. The Baila Parkinson method, consisting of 50-minute sessions conducted twice weekly for 6 months, also displayed improvements in overall balance and gait performance. Interventions incorporating Argentine Tango, delivering 1-hour sessions twice weekly over a shorter period of 10 weeks, did not demonstrate significant improvements in certain motor performance tests like the MDS-UPDRS III and the Gait Dynamic Index potentially due to the shorter intervention period, but did still report significant improvements in scores for the Timed Up and Go (TUG) test, which evaluates functional mobility, and the 6-Minute Walk Test (6MWT), still showing improvements in aspects of motor functioning. Moreover, these improvements in TUG and 6MWT scores were maintained after 8 weeks of stopping the intervention at a short-term follow-up.

Comparison to Traditional Rehabilitation

To evaluate the clinical relevance of dance therapy, it is important to examine whether it provides additional benefits beyond those achieved through traditional rehabilitation approaches. In the study of Argentine Tango dance therapy, the dance therapy group was compared to a traditional rehabilitation group that received static and dynamic balance exercises along with gait training. Significant improvements in functional mobility and endurance, as measured by the Timed Up and Go (TUG) and the 6-Minute Walk Test (6MWT), were observed in the dance therapy group. In contrast, the traditional rehabilitation group did not demonstrate any significant changes over the same period. Furthermore, another study using combinations of steps and movements from aerobic, jazz, tango, and classical ballet, implementing weekly 60-minute sessions for 12 weeks, observed greater effect sizes in TUG scores in a dance group compared to a traditional rehabilitation group. Moreover, the dance group demonstrated significant improvement in Berg Balance Scale (BBS) scores while the traditional rehabilitation group did not (Hashimoto et al., 2015). However, when comparing traditional rehabilitation to dance therapy across separate studies, effect sizes typically appear larger for traditional rehabilitation. This may be due to several factors. Firstly, both traditional rehabilitation programs and dance therapy vary substantially in duration, frequency, and intensity across studies. Interventions with longer durations, higher session frequencies, or greater intensity may produce larger effect sizes, independent of the type of intervention itself. There may also be a stigma associated with engaging in interventions that are not perceived as 'medicinal,' particularly among older individuals who comprise the majority of participants in these studies. This may result in a reduced willingness to participate, which could influence the level of engagement and intensity of participation, thereby affecting the outcomes of the intervention. Additionally, traditional rehabilitation includes a broad range of approaches such as balance training, strength exercises, gait training, and task-specific functional practice. The variety in these methods may

influence results, as certain approaches may be more or less effective for motor function outcomes. As a result, the differences in effect sizes across studies may be due to variations in intervention design rather than the type of intervention itself.

Overall, dance therapy demonstrated significant improvements in motor functioning among patients with mild to moderate stages of Parkinson's disease, with most consistent improvements observed in gait and balance. Based on the presented evidence, it appears that dance therapy with longer intervention periods and dance styles other than Argentine Tango have the most significant impact on motor symptoms in patients with Parkinson's disease.

COGNITIVE OUTCOMES

Cognitive deficits are a common non-motor feature of Parkinson's disease, often manifesting in domains such as executive function, attention, memory, and visuospatial processing. Thus, addressing cognitive decline through therapeutic interventions for individuals with Parkinson's disease has become an increasingly important focus. As a result, many studies investigating dance therapy examine its potential to improve cognitive function in individuals with Parkinson's disease.

Cognitive Assessments and Participant Inclusion Criteria

Studies examining the cognitive effects of dance therapy in individuals with Parkinson's disease employ standardized cognitive assessments to objectively measure cognitive function before and after intervention. Across the included studies, a range of validated assessments were used to assess both global cognition and specific cognitive domains. Global cognitive function was commonly measured using the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA). Both the MMSE and the MoCA are used to screen for cognitive impairment and dementia, assessing domains such as recall, attention, language, and orientation. Aside from global cognitive tests, domain-specific assessments were also used. Executive function was frequently assessed using the Frontal Assessment Battery (FAB), which measures conceptualization, motor programming, mental flexibility, sensitivity to interference, inhibitory control, and environmental autonomy. Additional tests evaluating executive function include the Trail Making Test (TMT) Parts A and B and the Stroop Test, which assess cognitive flexibility, processing speed, and inhibitory control. Visuospatial ability and mental imagery were also assessed using the Mental Rotation Task (MRT), which measures the ability to mentally rotate objects. Cognitive performance related to Parkinson's disease-specific impairments was also evaluated using the Scales for Outcomes in Parkinson's Disease-Cognition (SCOPA-COG), which assesses memory, attention, executive function, and visuospatial processing (Hashimoto et al., 2015; de Natale et al., 2017; Prewitt et al., 2017; Kalyani et al., 2019; Rooprai et al., 2026).

Initial cognitive status of participants varied across the included studies, although most participants were characterized as having no severe cognitive impairment. In one study, the MMSE was used to establish

eligibility, with participants required to score above 25 points, indicating the absence of significant cognitive impairment and dementia. Similarly, in another study, participants demonstrated high scores on the Addenbrooke's Cognitive Examination at study entry, indicating an absence of dementia and no cognitive impairment. Overall, the participant samples across all included studies consisted of individuals with mild to moderate Parkinson's disease and without severe cognitive impairment at study entry.

Global Cognition

In a 6-year longitudinal study, participants in the dance group who attended a 75-minute Dance for PD class once per week showed greater improvement in global cognition, as measured by the MMSE, over the six years compared to the non-dancing reference group. After two years of participation, participants in the dance group demonstrated significantly higher standardized cognitive scores compared to the reference group. The differences remained significant over the following three yearly measurements (Rooprai et al., 2026). However, the improvement was no longer significant in the final year of measurement, suggesting that the natural progression of Parkinson's disease may have limited the effectiveness of dance therapy in counteracting cognitive decline. Other studies did not investigate the changes in global cognitive function, focusing instead on specific cognitive domains.

Executive Function

As a central component of cognitive functioning, executive function improvements were assessed across the majority of studies. In one study, 10-week Argentine Tango dance therapy conducted twice weekly with 60-minute sessions demonstrated significant improvements in both the TMT-A and TMT-B immediately after the intervention and at a follow-up test 8 weeks later, while no such improvements were observed among patients participating in traditional rehabilitation. However, no group demonstrated significant improvements in FAB scores and Stroop Test scores (de Natale et al., 2017). In another study of dance therapy using combinations of steps and movements from aerobic, jazz, tango, and classical ballet, implementing weekly 60-minute sessions for 12 weeks, significant improvements in FAB scores were reported. Furthermore, the improvements in FAB scores of the dance group were significantly greater than those of the traditional rehabilitation group (Hashimoto et al., 2015). Additionally, another study conducted 60-minute dance therapy sessions twice a week for 8 weeks, consisting of combinations from a large repertoire of partner, group, and line dances, including the bachata, ballroom waltz, Texas two-step, polka, shim-sham, swing, Cajun waltz, foxtrot, samba, tango, square dance, electric slide, meringue, samba, and barangara. In this study, a section of the SCOPA-COG specifically measuring executive function was administered before and after the dance class in week 5 of the intervention. Test results showed a significant improvement after a single hour of dance (Prewitt et al., 2017). In addition, after 12 weeks of 60-minute Dance for PD sessions conducted twice weekly in a different study, significant improvements were also reported in overall TMT B-A scores, specifically with TMT-B scores improving significantly while TMT-A scores did not (Kalyani et al., 2019). Across the studies investigating executive function, although not all tests reached statistical significance, all studies demonstrated significant improvement in at least one executive function measure.

Memory

In addition to executive function, memory was also examined as a key domain of cognitive functioning in the included studies. In one study, episodic memory was tested using the Picture Sequence Memory Test and the Auditory Verbal Learning Test. Participants, after 12 weeks of 60-minute Dance for PD sessions held twice weekly, demonstrated significant improvements on the Auditory Verbal Learning Test but did not show significant changes on the Picture Sequence Memory Test (Kalyani et al., 2019). Another study conducted 60-minute dance therapy sessions twice weekly for 8 weeks, consisting of combinations from a large repertoire of partner, group, and line dances. The study measured verbal recall during week 4 of the intervention using a section of the SCOPA-COG before and after a single hour of dance class. The study did not report a significant improvement in verbal recall as measured by the SCOPA-COG, likely due to the limited duration of the intervention, as only a single hour of dance was performed (Prewitt et al., 2017). Although reported less frequently, evidence suggests that dance therapy of sufficient duration may significantly improve memory performance in areas such as verbal learning.

Visuospatial

Another component of cognitive functioning investigated by the included studies was visuospatial performance. In the study using combinations of steps and movements from aerobic, jazz, tango, and classical ballet, participants demonstrated a significant decrease in MRT response time after weekly 60-minute sessions over 12 weeks. Compared with a traditional rehabilitation group, the dance group reported a significantly greater change on this measure. However, MRT scores did not show a significant improvement, despite improved response time (Hashimoto et al., 2015). In an 8-week study consisting of 60-minute sessions conducted twice weekly employing combinations from a large repertoire of partner, group, and line dances, visuospatial performance was assessed before and after an hour of dance class during week 2 of the intervention. However, no significant improvements in visuospatial performance were reported (Prewitt et al., 2017). Overall, findings across studies on visuospatial outcomes show significant improvements only in response time and not in visuospatial assessment scores.

In summary, dance therapy for patients with mild to moderate Parkinson's disease demonstrated variable effects across cognitive domains, with consistent improvements observed in executive function. Findings for improvements in memory and visuospatial function, however, were less consistent. Based on the presented evidence, it appears that programs incorporating a combination of dance genres may be broadly beneficial for cognitive functioning, with particularly pronounced effects on executive function and greater effectiveness observed with longer intervention lengths. Results from a limited number of comparative studies suggest that dance therapy may be associated with greater improvements in some cognitive domains compared with traditional rehabilitation, although the evidence remains limited and heterogeneous. Long-term findings also indicate that although the cognitive benefits of dance therapy may diminish over time as degeneration progresses, dance therapy may still help prolong the period of higher levels of cognitive functioning, delaying cognitive decline into the later stages of the disease.

AFFECTIVE OUTCOMES

Beyond motor and cognitive symptoms, individuals with Parkinson's disease commonly experience affective symptoms. These symptoms frequently manifest as depression, anxiety, and reduced quality of life, having the potential to significantly impact daily functioning and overall well-being. As a result, therapeutic interventions that could reduce the severity of these affective symptoms may offer substantial value. Several studies have assessed the effects of dance therapy on affective symptoms in individuals with Parkinson's disease.

Affective Assessments and Participant Inclusion Criteria

Studies examining affective outcomes employed standardized assessments to measure changes before and after dance therapy. Symptoms of depression were commonly assessed using validated scales such as the Hospital Anxiety and Depression Scale (HADS), the Montgomery-Asberg Depression Rating Scale (MADRS), the Geriatric Depression Scale (GDS), and the Self-Rating Depression Scale (SDS). Quality of life was evaluated using measures such as the Parkinson's Disease Questionnaire (PDQ-39), which assesses domains including emotional well-being, social functioning, and daily activities. Functional and perceived well-being were also measured using the Schwab and England Activities of Daily Living (S&E ADL) scale, which evaluates levels of independence in daily functioning. Apathy was also measured using the Apathy Scale (AS). Across the included studies, these assessments provided quantitative measures of depression, daily functioning, apathy, and quality of life (Hashimoto et al., 2015; Prewitt et al., 2017; Kalyani et al., 2019; Duarte et al., 2023).

Initial affective status varied across participants and across the included studies. In one study, most participants presented with mild depressive symptoms prior to the intervention, as measured by the MADRS. Other studies consisted of individuals with Parkinson's disease who did not exhibit severe psychiatric conditions. Overall, the participant samples consisted of individuals with mild to moderate Parkinson's disease and varying levels of affective symptoms at study entry.

Depression

Changes in depressive symptoms after dance therapy varied across the included studies. In one study employing the Baila Parkinson method, 61.54% of the sample was classified as having mild depression prior to a 24-week intervention consisting of 50-minute sessions conducted twice weekly. Following the intervention, this percentage decreased to 23.08%. There was also a significant reduction in mean MADRS scores (Duarte et al., 2023). In another study, 60-minute Dance for PD sessions conducted twice weekly for 12 weeks also demonstrated improvements in participant depression scores as measured by the HADS and MDS-UPDRS Part I (Kalyani et al., 2019). Similarly, another study reported improvements in depressive symptoms as measured by a significant reduction in SDS scores after 12 weeks of dance

therapy combining aerobic, jazz, tango, and classical ballet in weekly 60-minute sessions. In contrast, a traditional rehabilitation group did not report significant improvement in SDS scores (Hashimoto et al., 2015). However, when assessed using GDS scores, no significant improvement in depressive symptoms was reported following an 8-week intervention consisting of 60-minute sessions conducted twice weekly using combinations of partner, group, and line dances (Prewitt et al., 2017). This finding may be due to the relatively short duration of the intervention. Nonetheless, most studies demonstrated significant improvements in depressive symptoms following dance therapy.

Quality of Life and Related Outcomes

In addition to depressive symptoms, changes in quality of life and related outcomes are important aspects to consider. In two studies, one using the Baila Parkinson method over a 24-week intervention consisting of 50-minute sessions conducted twice weekly, and another using the Dance for PD program over a 12-week intervention consisting of 60-minute sessions conducted twice weekly, significant improvements in quality of life were observed, as measured by the PDQ-39 (Kalyani et al., 2019; Duarte et al., 2023). Other included studies did not use the PDQ-39 to explicitly measure improvements in quality of life. For instance, one study reported an increased level of independence in daily functioning following the 8-week intervention consisting of 60-minute sessions conducted twice weekly using combinations of partner, group, and line dances, with S&E ADL scores significantly improving (Prewitt et al., 2017). Additionally, as indicated by a decrease in AS scores, significant improvements in apathy symptoms were observed following another 12-week intervention combining aerobic, jazz, tango, and classical ballet in weekly 60-minute sessions. These improvements in apathy symptoms were not observed in a traditional rehabilitation group (Hashimoto et al., 2015). Overall, improvements in quality of life and related affective outcomes were observed across all included studies.

Altogether, affective outcomes were evaluated across studies using standardized measures of depression, daily functioning, apathy, and quality of life. Across the included studies, patients with mild to moderate Parkinson's disease largely demonstrated notable improvements in depressive symptoms and quality of life following participation in dance therapy. Moreover, some studies suggest that dance therapy may provide greater improvements in depressive symptoms and apathy compared with traditional rehabilitation, although the limited number of direct comparative studies and variability in intervention protocols prevent definitive conclusions.

DISCUSSION AND LIMITATIONS

Dance therapy demonstrates multidimensional benefits across motor, cognitive, and affective domains, supporting their potential as a therapeutic approach for individuals with Parkinson's disease. Improvements in motor function may be partly explained by the physical demands of dance, including repeated practice of balance, coordination, and gait-related movements, which may facilitate neuroplastic adaptations in cortical motor networks. In addition, rhythmic auditory cueing provided by music has been

proposed as a mechanism that may facilitate movement initiation and gait by engaging alternative neural pathways and compensating for impaired internal cueing associated with basal ganglia dysfunction (Wang et al., 2022). Similarly, improvements in cognitive functioning, particularly in executive function, may be supported by the integration of rhythm, coordination, sequencing, and dual-task demands, which require simultaneous motor and cognitive processing. Repeated participation in these complex activities has been hypothesized to promote neuroplastic adaptations and recruitment of cortical networks involved in motor planning and executive control (Petzinger et al., 2013). Affective benefits, including reductions in depressive symptoms and improvements in quality of life, have also been hypothesized to be linked to the social interaction, musical engagement, and enjoyment associated with dance participation (Hashimoto et al., 2015).

These positive affective experiences may promote greater engagement and adherence to therapy, which could indirectly contribute to improvements in motor and cognitive outcomes over time. However, the extent to which affective benefits influence adherence and subsequent functional improvements remains unclear. Additionally, improvements in motor functioning have been proposed to contribute to increased confidence and independence, which may subsequently support affective outcomes. Although these interactions are plausible, the extent to which improvements in one domain directly influence outcomes in another remains uncertain. Nevertheless, the domains of motor, cognitive, and affective functioning may be interconnected rather than entirely independent. Overall, the findings support the use of dance as a complementary therapy rather than a replacement for Parkinson's disease treatment, with the potential to produce multimodal outcomes across these domains.

The variability in outcomes across motor, cognitive, and affective domains indicates that intervention design may be critical to intervention outcomes. Factors that vary considerably across studies, such as duration, frequency, and intensity, are likely to significantly influence the results of the intervention. Discrepancies in findings, in which studies demonstrated weaker effects than others, were often associated with shorter intervention durations. This suggests that short-term programs may not be sufficient to produce significant or meaningful outcomes. As a result, studies with limited intervention durations may cause an underestimation in the effectiveness of dance therapy. Careful consideration of these factors is therefore essential when evaluating the impact of dance-based therapies. Additionally, long-term follow-up assessments are much less common than immediate post-intervention assessments. This makes it difficult to determine whether the observed improvements of dance therapy are sustained over time or diminish once participation stops. Given that Parkinson's disease is a progressive condition, understanding the sustainability of intervention effects is crucial for evaluating their clinical relevance. In addition to the sustainability of improvements, another factor critical to consider in evaluating the clinical relevance of dance therapy is its ability to provide benefits that traditional rehabilitation cannot offer. There is a limited number of studies that directly compare dance therapy with traditional rehabilitation approaches. Because differences observed across separate studies may be due to variations in study design rather than legitimate differences in intervention efficacy, determining the relative effectiveness of these interventions becomes more challenging.

Another limitation of research in this field is the frequent use of small sample sizes, which is common in clinical research involving Parkinson's disease due to recruitment and logistical challenges. Small sample sizes limit the generalizability of findings to the broader Parkinson's disease population. This may also result in exaggerated or underestimated effect sizes due to random variation. Additionally, the current evidence base includes relatively few randomized controlled trials, with many studies employing quasi-experimental or single-group designs. This limits the strength of causal inferences regarding the effectiveness of dance therapy and increases the risk of confounding variables influencing reported outcomes. Publication bias should also be considered when interpreting the current literature. Studies reporting positive effects of dance therapy are more likely to be published than studies reporting null or negative findings, potentially resulting in an overrepresentation of positive results within the available evidence.

Moreover, studies predominantly recruit participants with mild to moderate Parkinson's disease. This limits the generalizability of findings from patients at more severe stages of the disease, who may respond to dance therapy differently as they experience greater motor and cognitive impairment. Therefore, further research is needed to determine the effectiveness of dance therapy for individuals at more advanced stages of Parkinson's disease. Furthermore, because motor symptoms in patients with Parkinson's disease fluctuate significantly from day to day, standardized clinical motor scales and clearly operationalized gait parameters, although enabling objective measurement of motor outcomes, may not fully capture patients' real-world motor variability (Janssen Daalen et al., 2025). As a result, this variability may introduce potential inaccuracies in the measurement of motor outcomes. Similarly, self-reported measures of affective outcomes may also pose a limitation. Metrics evaluating depression, anxiety, and quality of life are subjective and may be influenced by participants' mood at the time of assessment. Additionally, participants' expectations or desire to experience improvement may introduce response bias and contribute to reported improvements that may not necessarily reflect genuine changes, potentially resulting in an overestimation of intervention effectiveness. In addition to motor and affective outcomes, cognitive assessment results may also be influenced by test-retest effects. In studies that utilize repeated administration of the same cognitive assessments before and after interventions, improvements may be caused by familiarity with the test rather than definite cognitive change. In studies without a control group, this practice effect can result in an overestimation of intervention effectiveness.

CONCLUSIONS

Nevertheless, the current body of literature provides compelling evidence suggesting that dance therapy can meaningfully support individuals with Parkinson's disease across motor, cognitive, and affective domains. In particular, dance programs designed specifically for Parkinson's disease patients, such as the Baila Parkinson method and Dance for PD program, as well as other interventions that incorporate a combination of dance genres demonstrate promising potential as a holistic and engaging therapeutic approach for individuals with Parkinson's disease. Across studies, dance therapy was associated with consistent improvements in balance and gait, executive functioning, as well as depressive symptoms and

quality of life. Although improvements in motor outcomes are valuable, the distinct value of dance therapy may lie in its ability to target cognitive and affective functioning alongside motor performance, areas that conventional therapeutic approaches do not commonly address.

The integration of dance-based interventions into clinical and community rehabilitation structures should be considered for future directions. Pairing structured dance programs alongside conventional treatment for individuals with Parkinson's disease may help address psychosocial needs that are not consistently addressed by other therapeutic approaches. If continually refined and implemented, dance therapy has the potential to become an effective and widely adopted complementary component in the management of Parkinson's disease.

ACKNOWLEDGEMENTS

Thank you for the guidance of Matthew Bailey from the University of Cambridge in the development of this research paper.

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